AUSTRALASIAN CERATOPOGONIDAE (DIPTERA, NEMATOCERA)

Part XV: The Genus *Alluaudomyia* Kieffer in Australia and New Guinea

Margaret L. Debenham
School of Public Health and Tropical Medicine, University of Sydney

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Synopsis

The Australian and New Guinea species of the genus *Alluaudomyia* Kieffer are revised. Ten new species and one new subspecies are described, Skuse's *Ceratopogon latipennis* is transferred to this genus, and Tokunaga's *Alluaudomyia novaguineae* is placed in synonymy with *Alluaudomyia spinosipes* Tokunaga. New data are recorded for some previously described species, and a key is provided for identification of the 25 known species found in the area.

This study was prompted by the publication of Wirth and Delfinado's comprehensive revision of the Oriental species of *Alluaudomyia* (1964). In this paper the authors state that " only the Neotropical and Australian species are now poorly known, but undescribed material indicates that the genus is not well represented in the extreme south. Only 3 or 4 species collected in Australia . . . are known to us." The present study raises the number of species recorded from the Australian mainland to 14, but of these four are New Guinea or Oriental species which have penetrated to the far north of Australia and a further three have thus far only been recorded from the north of the continent, although they are not yet known from New Guinea. Of the remaining seven species, only two, *latipennis* and *alpina*, appear to have a purely southern distribution.

The first species of the genus to be recorded from the Australia-New Guinea area was described by Skuse in 1889 under the name *Ceratopogon latipennis*, but the correct generic status of this species has until now been unrecognized, and consequently it was omitted from Wirth and Delfinado's list of world species. No further record of the genus in this area appeared until 1955, when Lee and Reye reported its occurrence in Queensland and New South Wales. In 1959 a single species was described from New Guinea by Tokunaga, and a further 11 species were named from the same area in 1963, while one species previously described from Micronesia was also recorded. The present paper increases to 25 the number of species known from the Australia-New Guinea area. Of these 10 are new and one is a new subspecies of an Oriental species.

Wirth and Delfinado placed the Oriental species in five groups based on characters of wing pattern, spermathecae, hypopygium and leg banding. These groups have not been followed in the present paper as some of the Australian species combine the characteristics of more than one group, resulting in a partial breakdown of the classification. At present it appears that a group system based on the number and form of the spermathecae and certain male genitalic characters may be possible, but the resulting groups would be too large and contain too many widely differing forms to be of any practical value.

Method of Description

All new descriptions are based on slide specimens cleared in a mixture of one part absolute alcohol to one part creosote and mounted in balsam on microscope slides, except for the few cases where alcoholic or pinned specimens have been available for detailed description of the thoracic pattern.

Table of Measurements

Measurements of newly described species are based on the holotype and, if available, the allotype, unless otherwise stated. Measurements of previously described species are taken directly from the original descriptions. Wing length is measured from the basal arculus to the wing tip, which gives a value approximately one-tenth less than the measurement employed by Tokunaga, and allowance should be made for this.

Morphological Terms

See Wirth (1952) and, for modifications, my previous paper in this series (Part XIII, Proc. Linn. Soc. N.S.W., 94 (2) : 145, 1970). For pupal characters, see Jones (1961). Length is measured from the vertex of the head to the tip of the abdomen.

Illustrations

Except for drawings of thoracic pattern, which are freehand, these were done with the aid of a graticule and squared paper. All are based on type specimens unless otherwise stated. In figures of femora and tibiae, the fore leg is uppermost.

Location of Types

Types of newly described species are lodged in the collection of the School of Public Health and Tropical Medicine, Sydney, unless otherwise stated. Paratypes, where available, are in the School of Public Health ; Australian National Insect Collection, Canberra, A.C.T. ; United States National Museum, Washington ; British Museum (Natural History) ; B. P. Bishop Museum, Honolulu.

Abbreviations

S.P.H. & T.M. . .	School of Public Health and Tropical Medicine, Sydney.
A.N.I.C. . .	Australian National Insect Collection, Canberra, A.C.T.
a.m.	anteromarginal (tubercle).
d.a.s.m. . .	dorsal anterosubmarginal (tubercle).
l.a.s.m. . .	lateral anterosubmarginal (tubercle).
d.p.m. . .	dorsal posteromarginal (tubercle).
l.p.m. . .	lateral posteromarginal (tubercle).
v.p.m. . .	ventral posteromarginal (tubercle)

Genus Alluaudomyia Kieffer

Alluaudomyia Kieffer, 1913, Voyage Ch. Alluaud et R. Jeannel en Afrique Orientale, Dipt., *1* : 12 ; de Meillon, 1939, *J. ent. Soc. S. Africa*, *2* : 7 ; Okada, 1942, *Trans. Nat. Hist. Soc. Formosa*, *32* : 315 ; Wirth, 1952, *Ann. ent. Soc. Amer.*, *45* : 423 ; Tokunaga and Murachi, 1959, *Ins. Micronesia*, *12* : 352 ; Wirth and Delfinado, 1964, *Pacif. Insects*, *6* : 599. Type species, by monotypy, *Alluaudomyia imparunguis* Kieffer.

Neoceratopogon Malloch, 1915, *Bull. Ill. St. Lab. Nat. Hist.*, *11* : 310. Type species, by original designation, *Ceratopogon bellus* Coquillett.

Prionognathus Carter, Ingram and Macfie, 1921, *Ann. Trop. Med. Parasit.*, *14* : 309. Type species, by original designation, *Prionognathus marmoratus* Carter, Ingram and Macfie.

Thysanognathus Ingram and Macfie, 1922, *Ann. Trop. Med. Parasit.*, *16* : 244 (*nom. nov.* for *Prionognathus* Carter, Ingram and Macfie, *nec* La Ferté-Sénectère).

Isoecacta Garrett, 1925, Seventy New Diptera, p. 9. Type species, by monotypy, *Isoecacta poeyi* Garrett=*bella* (Coquillett).

Generic Diagnosis (from Wirth and Delfinado, 1964)

Body moderately slender, not strongly hairy, usually small to medium, but occasionally larger, up to 2·7 mm. Eyes bare or pubescent, contiguous to narrowly separated above. Palp 5-segmented, segment III usually with a small round pit on apical half bearing sensillae. Antenna 15-segmented, ♀ with distal 5 segments slightly elongated, ♂ with distal 3 segments elongated, plume present. Legs slender, without strong spines, occasionally with spine-like hairs ; hind first tarsal segment bearded ventrally, fourth tarsal segment of all legs cordate, fifth slender, unarmed. Empodium vestigial ; ♀ claws long and slender, simple, usually very unequal but sometimes subequal on one or more pairs of legs, ♂ claws all small and equal. Wing without microtrichia, macrotrichia usually present towards wing apex, sometimes extending over most of the membrane ; first radial cell absent, R_{4+5} thickened just before its junction with costa, costa ending before to beyond middle of wing, median fork petiolate. Abdomen moderately stout ; 1 or 2 sclerotized spermathecae present, sometimes an aberrant third one also present ; ♂ genitalia with very diverse specific modifications, but ninth tergite usually elongate, ninth sternite usually short with caudomedian excavation, aedeagus usually with basal arch and distinct caudomedian stem, parameres usually separate, with a lateral, sometimes detached, basal arm, elongate stem, and distal armature of one or more spines, lobes or filaments.

Key to Australian and New Guinea Species of ALLUAUDOMYIA

1. Wing with more than 3 conspicuous dark spots 2
   Wing with 3 or fewer conspicuous dark spots, these situated at end of costa, just before r-m cross-vein and on R_1 7
2. Wing with 7 spots arranged on M_1, M_2, M_{3+4}, Cu_1 and anal vein, as well as mottling on radial veins 3
   Wing with spots situated in cells as well as on veins 5
3. ♂ wing with 3 dark punctures on Rs before r-m cross-vein ; ♂ and ♀ wing without dark punctures on R_{1+5}[1] ..... 1. *personata* n. sp.
   ♂ wing without dark punctures on Rs before r-m cross-vein ; ♀ wing with 2 dark punctures on R_{1+5} 4
4. Aedeagus with a very elongate caudal stem ; spermatheca large, elongate oval, approximately 0·12×0·08 mm. ; some macrotrichia of ♀ wing with pale grey dots at bases .... 2. *annulipes australiensis* n. subsp.
   Aedeagus with a short caudal stem ; spermatheca smaller, more rounded, 0·09×0·06 mm. ; some macrotrichia of ♀ wing with conspicuous black dots at bases .... 3. *tokunagai* Wirth and Delfinado
5. Wing with spots in cells very close to wing margin ; spot at end of costa scarcely extending on to membrane ; mid and hind femora with basal half to two-thirds dark ; spermathecae without diverticula ..... 14. *varia* n. sp. (♀)
   Wing spots in cells not very close to wing margin ; spot at end of costa extending considerably on to membrane ; all femora broadly pale basally ; spermathecae with diverticula .. 6
6. ♀ with wing margin broadly infuscated, spot in cell M_1 elongate rectangular ; spot on vein R_1 absent in both sexes ..... 4. *fumosipennis* n. sp.
   ♀ without conspicuous infuscation on wing margin, spot in cell M_1 small and round ; both sexes with dark spot on vein R_1 ..... 5. *unguistyla* n. sp.
7. Wing with a single, usually pale, spot at end of costa, without definite spot on membrane just before r-m cross-vein, although Rs and M may be slightly infuscated 8
   Wing with a distinct spot before r-m cross-vein, sometimes also with a spot on R_1 12
8. Eyes bare 9
   Eyes pubescent 11
9. Legs entirely yellow ..... 6. *immaculata* Tokunaga
   Legs with pale but distinct brown bands 10
10. Abdomen largely yellow ; aedeagus of male plate-like, deeply bifid apically, somewhat resembling a fish-tail ..... 7. *insulana* Tokunaga and Murachi
    Abdomen dark brown dorsally, paler ventrally ; aedeagus of male arched, with a single, short apical point ..... 8. *verecunda* n. sp.

[1] In this part of the key it is assumed that the unknown ♀ of *personata* resembles the female of the closely related *bifurcata* Wirth and Delfinado ; this assumption may prove incorrect.

11. Wing of ♀ without macrotrichia, but with a row of spinule-like setae on anterior edge; ♂ aedeagus with a V-shaped apical notch, parameres hooked apically and with a long, slender apical process ..... 9. *papuae* Tokunaga
Mid femur with a narrow pale base, rest of basal half dark 23
Wing of ♀ with a moderate number of macrotrichia, without spinule-like setae; ♂ aedeagus with a W-shaped apical notch, parameres rounded apically, apical process long, flattened and tapered ..... 10. *bifasciata* Tokunaga

12. Spermathecae with diverticula; aedeagus bell-shaped, its apex produced into a short, ventrally bent process (Figs. 192, 205, 210, 216) 20
Spermathecae without diverticula; aedeagus various, but never as above 13

13. Very dark species, the legs dark brown with narrow paler bands preapically on all femora and sub-basally and preapically on all tibiae ..... 11. *alpina* n. sp.
Legs more extensively pale 14

14. Spot at tip of R_{1+5} extending well on to wing membrane, at least in ♀; spermathecae elongate oval, the long axis parallel to the neck; ♂ with coxites long and narrow, parameres with detached basal arms 15
Spot at tip of R_{1+5} scarcely, if at all, extending on to wing membrane; spermathecae round or, if oval, long axis perpendicular to the neck; ♂ with coxites rather short and stout, parameres with basal arms attached 17

15. Mid tibia pale except for dark base and apex ..... 12. *latipennis* (Skuse)
Mid tibia largely dark or at least with a distinct dark band on apical third 16

16. Humeral areas of scutum entirely pale; ♂ parameres with a long, broad, tapering preapical process arising well down the stem ..... 13. *appendiculata* n. sp.
Humeral areas pale, but with distinct dark punctations at bases of setae; ♂ parameres with a pale, relatively short setose preapical process arising within the apical loop ..... 14. *varia* n. sp. (♂)

17. Mid femur almost entirely brown, only narrowly pale basally and preapically ..... 15. *platipyga* Tokunaga
Mid femur with a broad brown central band, a narrow brown preapical band and a brown apex, rest whitish 18

18. Aedeagus of ♂ a simple arch with a single hook-like apical process arising from its dorsal surface; parameres with stems slender, two long apical processes; ♀ genital sclerotization simple, V-shaped, inconspicuous (Fig. 151) ..... 16. *reyei* n. sp.
Aedeagus with paired apical processes; parameres with stems broad basally, a single apical process; ♀ genital sclerotization larger, more conspicuous, U-shaped 19

19. Apical processes of aedeagus horn-like, not bent, broad basally and tapering to a rounded point; parameres with a long, tapering apical process; ♀ genital sclerotization distinctly U-shaped, without a heavily sclerotized process inside the loop of the "U" (Fig. 157) ..... 17. *bicornis* n. sp.
Apical processes of aedeagus laterally bent before tip; parameres with a very short, parallel-sided process; ♀ genital sclerotization very conspicuous, U-shaped but very broad and rounded, a triangular, heavily sclerotized process within the loop of the "U" (Fig. 162) ..... 18. *fragmentum* n. sp.

20. Mid femur with a distinct dark brown preapical band 21
Mid femur without a distinct dark preapical band; if band present it is very pale 24

21. Sub-basal dark band of mid tibia confluent with dark base forming a broad basal band ..... 19. *petersi* Tokunaga
Sub-basal dark band of mid tibia separated from dark base by a distinct white or yellow band 22

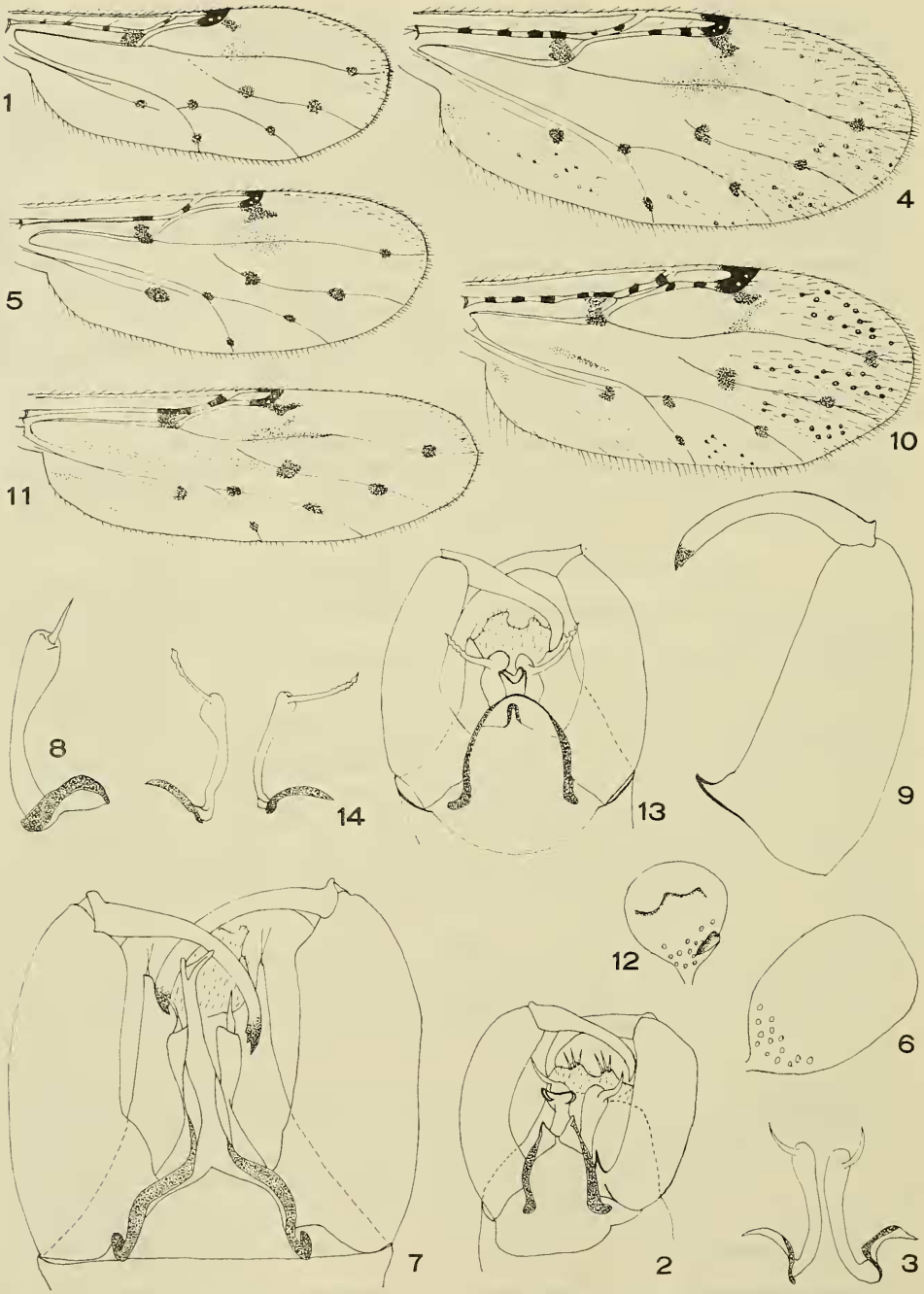
22. Basal half of mid femur entirely pale ..... 20. *astera* Tokunaga

23. Two spermathecae, one with a short, straight diverticulum, the other with a long, undulate diverticulum; stems of parameres slender, apices flattened, slightly bent laterally, sub-triangular, sharply pointed ..... 21. *jimmensis* Tokunaga
Both spermathecae with straight diverticula; male unknown ..... 22. *smeei* Tokunaga

24. Claws of fore and mid legs subequal in ♀; diverticula of spermathecae slightly swollen apically; stems of parameres very narrow on basal half, broader on apical half, apices short, pointed, bent at right angles to stem ..... 23. *spinosipes* Tokunaga
Claws of fore and mid legs very unequal in ♀; diverticula not swollen apically: parameres otherwise 25

25. Hind femur fuscous on basal two-thirds ..... 24. N.G. No. 1
Hind femur with base broadly pale and a dark central or post-central band 26

26. Diverticula of spermathecae short, subequal, about 0·012 mm. long; basal half of stem of parameres strongly swollen, apices not undulate, somewhat rounded .. 25. *brandti* Tokunaga
Diverticula of spermathecae unequal, longer, about 0·051 and 0·042 mm. long; stems of parameres only slightly swollen basally, apices slender, undulate, sharply tapered .... 26. *tenuistylata* Tokunaga



Figs 1–3. *Alluaudomyia personata*. 1, ♂ wing, ×55 ; 2, ♂ hypopygium, ×200 ; 3, ♂ parameres, ×200. Figs. 4–9. *Alluaudomyia annulipes australiensis*. 4, ♀ wing, ×55 ; 5, ♂ wing (Townsville paratype), ×55 ; 6, ♀ spermatheca, ×200 ; 7, ♂ hypopygium (Townsville paratype), ×200 ; 8, ♂ paramere (Maprik paratype), ×200 ; 9, ♂ coxite and style (Maprik paratype), ×200. Figs. 10–14. *Alluaudomyia tokunagai*. 10, ♀ wing (Siutmeri specimen), ×55 ; 11, ♂ wing (Innisfail specimen), ×55 ; 12, ♀ spermatheca (Korogo specimen), ×200 ; 13, ♂ hypopygium (Innisfail specimen), ×200 ; 14, ♂ parameres (Korogo specimen), ×200.

1. Alluaudomyia personata n. sp. (Figs 1–3, 15–16)

Type: Holotype ♂.

Type Locality: Moran's Creek, Innisfail, Queensland (5.ix.1963, H. Standfast).

A small, brown and yellow mottled species, very similar to *A. bifurcata* Wirth and Delfinado. Female unknown.

Male: Length 1·28 mm., wing 0·96 × 0·37 mm.

Head brown, vertex yellow. Eyes bare, separate. Palp brown, segment III with a small apical pit bearing sensillae (Fig. 15). Antennal segment II brown, segments III–XI whitish, XII–XIII brown, rest missing; plume brown.

Scutum yellow with brown mottling and punctures, scutellum yellowish but narrowly fuscous centrally, bearing 2 setae, postscutellum narrowly yellow on anterior edge, rest dark brown, pleuron yellow on upper half, brown on lower half. Coxae and trochanters light brown; legs whitish, all femora with basal half dark, femora and tibiae with many brown bands (Fig. 16), hind tibial comb of 5–6 spines; fore and hind first tarsal segment and basal half of mid first segment brown, rest of tarsi fuscous. Claws of fore and mid legs missing, of hind legs very small, less than one-third the length of the fifth tarsal segment, paired and equal, bifid at tip.

Wing (Fig. 1) with a dark spot before the r-m cross-vein, one at junction of costa and R_{4+5}, extending on to the wing membrane, and 7 posteriorly, one near apex of M_1, one near either end of M_2, one near apical end of M_{3+4}, Cu_1, and anal vein, and one on M_{3+4} just beyond $fMCu_1$, as well as 3 small punctures on Rs and 1 on R_1. Macrotrichia restricted to the wing margin between the ends of the costa and M_2. Haltere with stem white, knob fuscous but dark brown apically.

Abdomen very pale brown, pleural membranes grey. Hypopygium (Figs 2–3) brown, coxites narrow and curved, each with a strongly recurved ventral root, styles whitish, slightly swollen basally; aedeagus deeply arched, with a v-shaped notch apically, caudal stem with a pair of slender apicolateral processes, parameres each with an attached basal arm, stem slightly curved, swollen apically, preapical process moderately long, approximately one-third the length of the stem.

Distribution: Known only from the type locality.

This species is very close, in both coloration and form of genitalia, to *Alluaudomyia bifurcata* Wirth and Delfinado from Malaya and Thailand. However, it can be distinguished by the dark bases on all femora, the recurved ventral root of the coxites, the pointed, not rounded, sides of the apical notch of the aedeagus, and the much longer preapical processes of the parameres. It can be distinguished from other similar species known from the area by the form of the male genitalia and the presence, in the male, of punctations on Rs; assuming that the female closely resembles the female of *bifurcata*, it will be distinguishable from the females of *annulipes australiensis* and *tokunagai* by the absence of punctations on R_{4+5} and the absence of dots at the trichial bases.

2. Alluaudomyia annulipes australiensis n. subsp. (Figs 4–9, 17–22)

Types: Holotype ♂, allotype ♀ and 26 ♂♂ and 9 ♀♀ paratypes.

Type Locality: Townsville, Queensland (holotype 0001–0300 hours, allotype 2100–2359 hours, 18.xi.1955, light trap, Belgian Gardens, flying fox bait, A. K. O'Gower). Paratypes from Townsville (12 ♂♂, 1 ♀, 9.xi.1955, 1900–2100 hours, Belgian Gardens, A. K. O'Gower; 2 ♂♂, 1 ♀, 13.xi.1955, 2100–2359 hours, light trap, Belgian Gardens, mangrove tree, A. K. O'Gower; 1 ♀, 14.xi.1955,

light trap, Belgian Gardens, A. K. O'Gower ; 1 ♂, 17.xi.1955, 1920–2100 hours, light trap, Belgian Gardens, flying fox bait, A. K. O'Gower ; 4 ♂♂, same data as holotype ; 2 ♂♂, same data as holotype but 0300–0530 hours ; 1 ♂, 1 ♀, same data as allotype ; 1 ♂, 20.xi.1955, 2200–0600 hours, light trap, Belgian Gardens, mango tree near polluted swamp, A. K. O'Gower), from Darwin, Northern Territory (1 ♀, 27–29.xi.1957, 2400–0630 hours, light trap, Maranga, E. J. Reye ; 1 ♂, 1 ♀, 13–14.vi.1958, light trap, Quarantine Stn., E. J. Reye ; 1 ♂, same data but 16–17.vi.1958 ; 1 ♀, same data but 4–5.vii.1958, N. J. light trap ; 1 ♀, same data but 12–13.vii.1958 ; 1 ♀, same data but 26–27.vii.1958, suction light trap), and from Maprik,[1] New Guinea (1 ♂, 1958).

These specimens are very close to *Alluaudomyia annulipes* Wirth and Delfinado, described from Malaya and Thailand, but the males differ markedly in the length of the apical process of the parameres. In the Asian specimens this is very short and spine-like, but in the Australian and New Guinea specimens it is considerably longer, being approximately one-fourth the length of the stem. As this feature is consistent throughout the present series, the Australian-New Guinea form is here regarded as a distinct subspecies, at least until such time as intermediate forms may be collected. The females of *annulipes australiensis* can be distinguished from females of the nominate race only by locality of collection.

Male : Length 1·59 mm., wing 1·01 × 0·38 mm.

Head brown, frons yellowish. Eyes bare, just contiguous. Palp brown, segment III with an apical pit bearing several sensillae (Fig. 18). Antennal segments II–III brown, IV–XI very pale, XII light brown, XIII brown on basal half, white on apical half, XIV brown with apical fourth white, XV brown (Fig. 20) ; plume yellowish-brown.

Scutum yellowish with brown mottling and punctures, scutellum yellow, with 4 setae, postscutellum brown centrally, ochreous laterally, pleuron ochreous. Fore coxae ochreous, mid and hind coxae brown, trochanters brown, fore pair paler ; femora and tibiae yellow with brown bands and punctures as figured (Fig. 21), number of narrow bands variable, hind tibial comb of 5 spines ; tarsi fuscous, fore segment I, base and apex of mid segment I, all of hind segment I and all fifth tarsal segments light brown. Claws of all legs small, under half the length of the fifth tarsal segment, paired and equal.

Wing (Fig. 5) with a spot before r-m cross-vein, one on R_1 (the holotype also has a second small spot on R_1), one at junction of R_{4+5} and costa, and 7 small spots posteriorly, one near apex of M_1, one near either end of M_2, one near apical end of M_{3+4} and Cu_1, one at $fMCu_1$, and one on anal vein. Macrotrichia restricted to the wing margin between the ends of the costa and M_2. Haltere whitish, apex of knob brown.

Abdomen light brown, pleural membranes brown. Hypopygium (Figs 7–9) brown, the coxites yellowish apically and on their inner faces, styles bidentate, apices brown ; aedeagus with a shallow, rounded basal arch and an elongate, apically forked caudal stem, parameres with a short, attached basal arm, stem slightly bent, apex expanded, blunt, bearing a flattened, tapering process about one-fourth the length of the stem.

Female : Length 1·67 mm., wing 1·35 × 0·53 mm.

Generally similar to male, differing as follows :

Approximately 17 mandibular teeth. Antennal segments IV–V white, VI–VIII brown centrally, base and apex broadly white, IX–X brown centrally, base and apex light brown, XI–XIV brown with apex white, XV brown (Fig. 19).

[1] Specimens with the data " Maprik, New Guinea " are part of bulked light trap collections sent to S.P.H. and T.M. for study by Dr. W. Peters.

Claws of all legs unequal, ratio of length of claws to fifth tarsal segment 24 : 12 : 25 in fore, 23 : 12 : 24 in mid, 17 : 7 : 20 in hind (Fig. 22).

Wing (Fig. 4) also with several small brown punctures on Rs and R_{4+5}. Macrotrichia more extensive, on apical half of wing and in anal cell, with greyish dots at bases of many macrotrichia.

Cerci pale fuscous. Spermatheca large, elongate oval, with hyaline punctures anteriorly (Fig. 6).

Distribution: New Guinea, Northern Territory, north-eastern Queensland.

This subspecies can be distinguished from *tokunagai* by the form of the male genitalia, the larger, more elongate oval spermatheca, and the paler, less conspicuous dots at the trichial bases on the female wing.

3. Alluaudomyia tokunagai Wirth and Delfinado. (Figs 10–14, 23–27)

Alluaudomyia splendida Tokunaga, 1963 (*nec* Winnertz, 1852), *Pacif. Insects*, *5*: 216 (Type locality: Keravat, New Britain. Allotype from Goldie River, nr. Port Moresby, New Guinea; paratypes from Minj and Lae, New Guinea.)

Alluaudomyia tokunagai Wirth and Delfinado, 1964, *Pacif. Insects*, *6*: 633. *Nom. nov.* for *splendida* Tokunaga preocc. Winnertz, 1852.

Specimens examined: New Guinea: Korogo, Sepik River (2 ♂♂, 1 ♀, 8.iii.1964, D. H. Colless); Siutmeri, Sepik River (2 ♀♀, 17.iv.1964, D. H. Colless). Northern Territory: Darwin (1 ♂, 26–27.vii.1958, Quarantine Stn., suction light trap, E. J. Reye). Queensland: Innisfail (2 ♂♂, 13.vi.1963, Eubenangee Swamp, H. Standfast; 1 ♂, 5.ix.1963, Moran's Creek, H. Standfast).

Characteristics: Medium-sized mottled species. Head yellowish-brown, vertex with dark median spot, eyes bare. Scutum yellow, mottled with brown dots and stripes, scutellum entirely yellow or with a narrow central fuscous band, 4 setae in female, 2 in male, postscutellum yellow; legs yellow with many brown bands, basically as figured (Fig. 26) but number of narrow bands variable, female claws all very unequal, ratio of length of claws to fifth tarsal segment 28 : 15·5 : 27 in fore, 29 : 12·5 : 28·5 in mid, 23·5 : 9·5 : 25 in hind (Fig. 27), male claws all small and equal. Female wing with dark spots on Rs, R_1, R_{4+5}, M_1, M_2, M_{3+4}, Cu_1, and anal veins, and a spot proximal to r-m cross-vein, also with dark dots at some trichial bases (Fig. 10), male wing lacking spots on Rs and at trichial bases (Fig. 11), female with a moderate number of macrotrichia on apical half of wing and a few in anal cell, male with macrotrichia restricted to anterior edge and apex. Haltere with all or part of knob, and sometimes part of stem, fuscous. Abdomen pale ochreous to pale brown. Spermatheca (Fig. 12) large, single, oval, with hyaline dots before base of duct. Aedeagus with a deep basal arch and a small, four-pointed apical lobe, parameres separate, apical third expanded and flattened, with a slender preapical process (Figs 13–14).

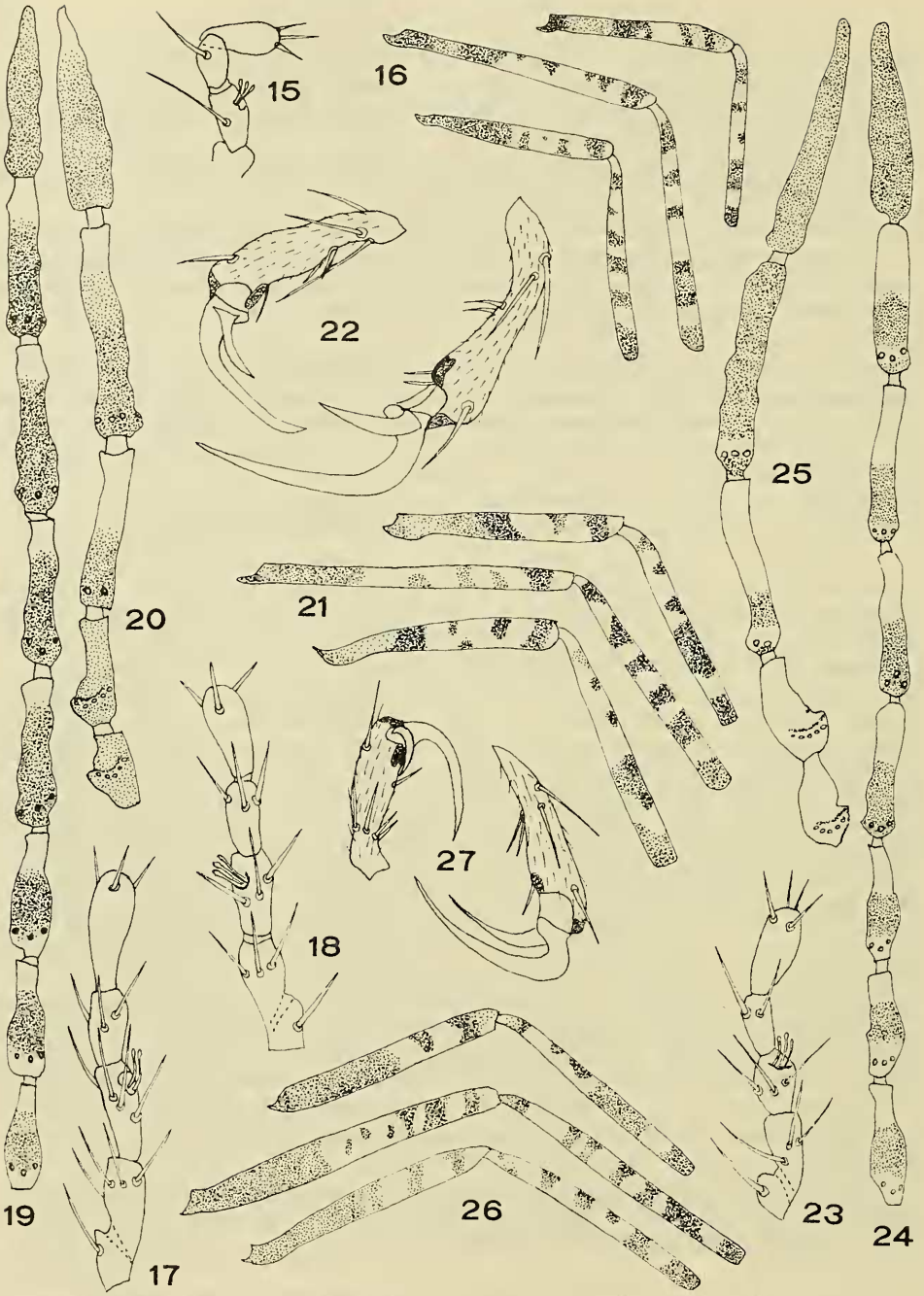
Distribution: New Britain, New Guinea, Northern Territory, north-eastern Queensland.

This species is readily distinguished from *annulipes australiensis* by the form of the male genitalia, the smaller, more rounded spermatheca and the very dark trichial bases on the female wing.

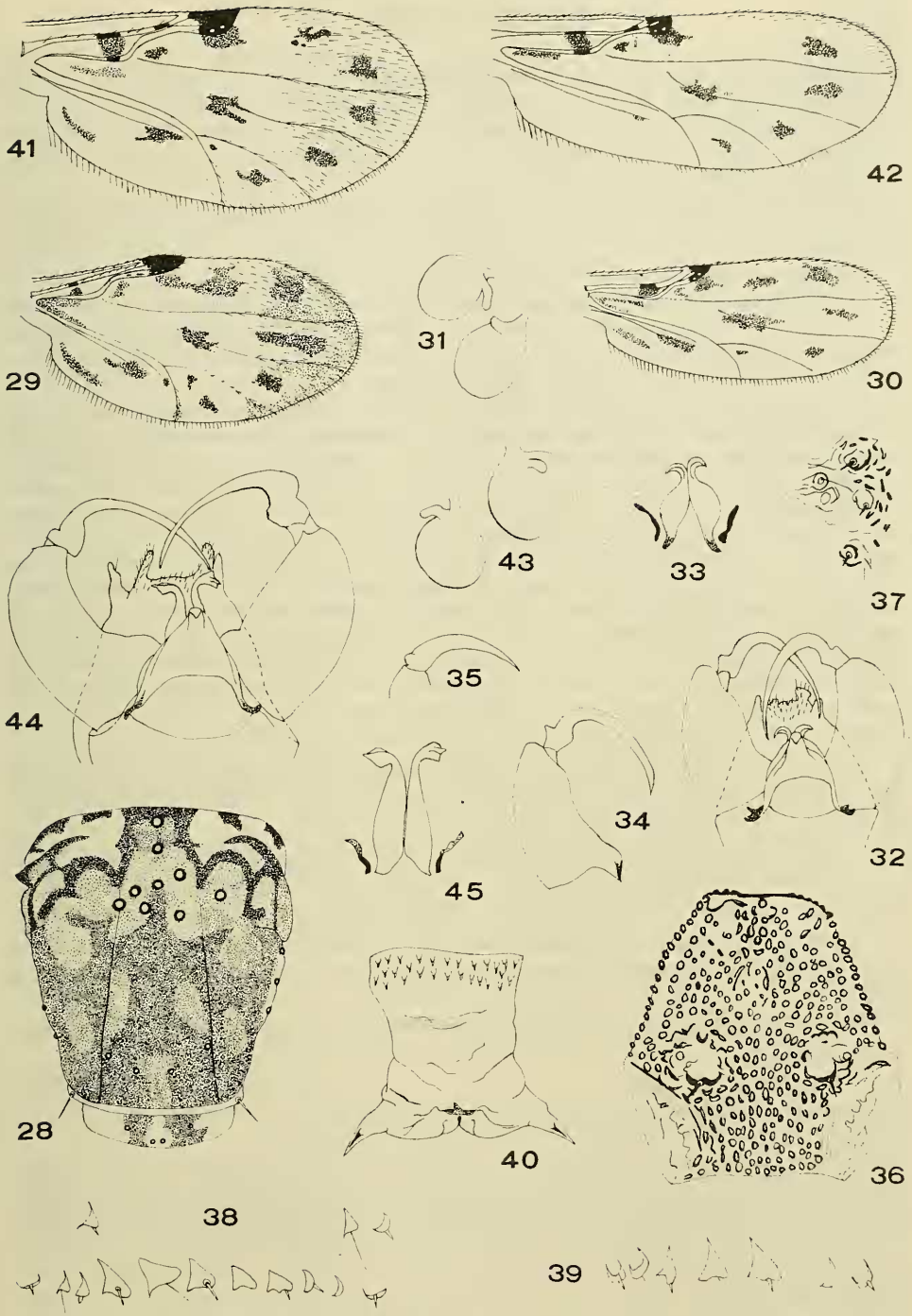
4. Alluaudomyia fumosipennis n. sp. (Figs 28–40, 46–51)

Types: Holotype ♀, allotype ♂, 20 ♂♂ and 29 ♀♀ paratypes.

Type Locality: Darwin, Northern Territory (holotype 14–15.vi.1958, allotype 30–31.x.1957, Quarantine Stn., N.J. light trap, E. J. Reye). Paratypes from Darwin (2 ♂♂, 2 ♀♀, 27–28.vi.1956, 1 ♂, 22–23.xi.1957, 1 ♂, 10–11.vi.1958, 1 ♀, 11–12.vi.1958, 3 ♀♀, 13–14.vi.1958, 1 ♀, same data as holotype, 1♂, 2♀♀,



Figs 15–16. *Alluaudomyia personata*. 15, ♂ maxillary palp, segments III–V, ×350; 16, ♂ femora and tibiae, ×90. Figs 17–22. *Alluaudomyia annulipes australiensis*. 17, ♀ maxillary palp, ×350; 18, ♂ maxillary palp, ×350; 19, ♀ antennal segments VIII–XV, ×350; 20, ♂ antennal segments XI–XV, ×350; 21, ♂ femora and tibiae, ×90; 22, ♀ fore (*right*) and hind (*left*) tarsus V and claw, ×350. Figs 23–27. *Alluaudomyia tokunagai*. 23, ♀ maxillary palp (Siutmeri specimen), ×350; 24, ♀ antennal segments VIII–XV (Siutmeri specimen), ×350; 25, ♂ antennal segments XI–XV (Korogo specimen), ×350; 26, ♀ femora and tibiae (Siutmeri specimen), ×90; 27, ♀ fore (*right*—Siutmeri specimen) and hind (*left*—Korogo specimen) tarsus V and claw, ×350.



Figs 28–40. *Alluaudomyia fumosipennis*. 28, dorsum of thorax (Mt. Crosby specimen); 29, ♀ wing, ×55; 30, ♂ wing, ×55; 31, ♀ spermathecae, ×200; 32, ♂ hypopygium. ×200; 33, ♂ parameres, ×200; 34, ♂ coxite and style ×200; 35, ♂ style (paratype), ×200; 36–40, pupa. 36, operculum, ×200; 37, dorsal tubercles of cephalothorax, ×200; 38, tubercles of 7th abdominal segment, ×200; 39, tubercles of 8th abdominal segment, ×200; 40, anal segment, ×200. Figs 41–45. *Alluaudomyia unguistyla*. 41, ♀ wing, ×55; 42, ♂ wing (Noonameena specimen), ×55; 43, ♀ spermathecae, ×200; 44, ♂ hypopygium (Yeerongpilly specimen), ×200; 45, ♂ parameres (Yeerongpilly specimen), ×200.

18–19.vi.1958, 1 ♂, 22–23.vi.1958, 3 ♂♂, 1♀, 28–29.vi.1958, 1 ♀, 2–3.vii.1958, 1 ♂, 1 ♀, 5–6.vii.1958, 1 ♀, 10–11.vii.1958, 2 ♀♀, 12–13.vii.1958, 7 ♂♂, 12 ♀♀, 26–27.vii.1958, Quarantine Stn., light trap, E. J. Reye ; 1 ♂, 26–27.xi.1957, 1 ♂, 1–2.viii.1958, East Arm Convent, light trap, E. J. Reye ; 1 ♀, 21.iv.1958, 1 ♀, 5–6.v.1958, N.J. light trap, J. Dyer ; 1 ♂, 4–5.vii.1958, Winellie, suct. light trap, E. J. Reye).

A small, mottled species, the wing with many spots on the veins and membrane.

Female : Length 1·36 mm., wing 0·82 × 0·42 mm.

Head brown, vertex and frons ochreous. Eyes bare, contiguous. Mandible with 11 teeth. Palp pale brown, segment III with a shallow preapical pit bearing several long sensillae (Fig. 46). Antennal segment II ochreous, III–IX brown with bases whitish, X–XV brown (Fig. 47).

Scutum light brown, humeral areas yellow, the whole with a pattern of mid and dark brown (Fig. 28), scutellum yellow with a brown band each side of centre, with 4 setae, postscutellum dark brown centrally, paler laterally, pleuron yellowish with a brown transverse central band. Coxae and trochanters yellowish-fuscous ; femora and tibiae whitish, the fore femur with a broad central brown band and brown apex, mid femur with a broad brown sub-basal band, narrow brown preapical band and brown apex, hind femur similar to fore femur, fore tibia with brown base and apex and a broad brown central band, mid tibia with brown base and apex, a narrow brown sub-basal band and a broader preapical band, hind tibia similar to fore but central band narrower (Fig. 49), hind tibial comb of 6 spines ; tarsi whitish but hind first tarsal segment pale brown, segments IV and V of all legs pale fuscous. Claws of all legs unequal, ratio of length of claws to fifth tarsal segment 16 : 11 : 19 in fore, 18 : 11 : 18 in mid, ? : 8 : 16 in hind (13 : 7 : 16 in paratype) (Fig. 50).

Wing (Fig. 29) with extensive dark markings, wing margin from beyond end of costa to end of M_{3+4} shaded grey. Macrotrichia numerous on apical half of wing. Haltere white with apex of knob brown.

Abdomen pale brown, darker distally. Cerci white. Spermathecae (Fig. 31) two unequal, subspherical, each with a short diverticulum.

Male : Length 1·44 mm., wing 0·78 × 0·30 mm.

Generally similar to female, differing as follows :

Antennal segment II dark brown, flagellum light brown (Fig. 48) ; plume brown.

Claws of all legs small, equal, simple, just over half the length of the fifth tarsal segment.

Wing (Fig. 30) without dark margin, spotting less extensive. Macrotrichia restricted to the wing margin between the ends of the costa and M_2. Haltere white.

Abdominal segments brown with posterior edges broadly white, the anterior three segments largely white. Hypopygium (Figs 32–34) brown, coxites rather short, styles yellow-brown, long, strongly curved and sharply pointed : aedeagus with basal arch extending to about half total height, apex bent ventrally, parameres short, stems swollen centrally, contiguous on apical half, apices curved laterally.

Pupa (Gilruth Plains specimen) : Light yellowish-brown, slightly darker on dorsum of thorax. Respiratory trumpet short, about four times as long as broad, with about 9 pairs of spiracles on apical half (Fig. 51). Operculum short and broad, median tubercle not distinguishable, a.m. tubercles situated between lateral corners, each with a short, fine spine, remaining surface without

spines, covered almost entirely with small tubercles (Fig. 36). Dorsal tubercles of cephalothorax as figured, 1, 2 and 3 with a short spine, 4 with a seta of medium length, 5 with pore only (Fig. 37). Tubercles of abdominal segments 3–7 as figured, d.a.s.m. 2 and l.a.s.m. with a short spine, d.a.s.m. 1 with a long, fine spine, all five d.p.m.'s present, 2, 3 and 5 with a short spine, 1 and 4 appear to be without spines ; l.p.m.'s 1 and 3 large, with a short spine, 2 similar but with a long fine spine, v.p.m.'s 1 and 3 with a short spine, 2 with a long spine (Fig. 38). Abdominal segment 8 lacking d.a.s.m.'s, l.a.s.m. and d.p.m.'s 3–5 (?), d.p.m. 2, l.p.m.'s 1 and 3 and v.p.m.'s 1 and 3 with a short spine, d.p.m. 1, l.p.m. 2 and v.p.m. 2 with a long, fine spine (Fig. 39). Anal segment with a basal band of 2–3 rows of small spines (Fig. 40).

Additional specimens : Queensland : Cloncurry River (1♀, pinned, 1.v.1955, 1715–1740 hours, Fort Constantine, net along damp edges of river bed, E. J. Reye) ; Longreach (1 ♀, 23.iv.1955, " Leander ", net on pond shore, E. J. Reye) ; Merivale Ck.-Maranoa R. junction (1 ♂, 1 ♀, 6.xi.1952, 6–9 p.m., suction light trap, A. L. Dyce) ; Mt. Crosby (1 ♂, 6 ♀♀, ♀'s in alcohol, 5.xii.1965, dusk-dawn, Lake Manchester Rd., 250 yds. from Brisbane Rd., in narrow, well-grassed, timbered gully, light trap, A. L. Dyce and M. D. Murray) ; Redbank Plains (1 ♀, 12.xii.1967, light trap, A. L. Dyce) ; Gilruth (1 ♂, 1 ♀, 26.vii.1963, light trap, A. L. Dyce and M. D. Murray ; 3 ♂♂, 5 ♀♀, 15.xii.1963, light trap, A. L. Dyce) ; Gilruth Plains (1 ♂, 2.ii.1963, light trap, 2 ♀♀, 1.iii.1963, bred, A. L. Dyce and M. D. Murray) ; Goodar Crossing, Weir R. (2 ♀♀, 28.iii.1953, 1730–2130 hours, suct. light trap, W. E. Poole) ; Yelarbon (1 ♂, 2 ♀♀, 27.iii.1953, 1800–2115 hours, 4 ♀♀, 27–28.iii.1953, 2115–0045 hours, suct. light trap, W. E. Poole) ; Noondoo (7 ♀♀, 29–30.iii.1952, 2145–0130 hours, bored spring, suct. light trap, W. E. Poole ; 1 ♀, 16.xii.1963, light trap, A. L. Dyce) ; Texas Stn. (1 ♂, 26.iii.1953, dusk–2130 hours, suction light trap, A. L. Dyce). New South Wales : Moree (1 ♂, 1 ♀, 1951, light trap, A. L. Dyce ; 1 ♂, no data except collector, A. L. Dyce, but probably from Moree ; 1 ♀, 30.i.1952–31.i.1952, 2030–dawn, mercury vapour light trap, A. L. Dyce ; 5 ♂♂, 23.ii.1963, to light, A. L. Dyce and M. D. Murray) ; Mungie Bundie, Meehi R., Moree (1 ♂, 16.ii.1952, 2000–2130 hours, suct. light trap, A. L. Dyce) ; Bundy Creek, via Moree (1 ♀, 1.xi.1951, light trap, 7 ♂♂, 6.xii.1951, 1700–2000 hours, 10 ♂♂, 6.xii.1951, 1800–2100 hours, 15 ♂♂, 5 ♀♀, 1 ♂ gynandromorph, 7.xii.1951, 2400–0200 hours, 13 ♂♂, 6 ♀♀, 7.xii.1951, 0200–0500, 1 ♂, 7.xii.1951, 0500–0700 hours, mercury vapour light trap, A. L. Dyce ; 1 ♀, pinned, v.1952, 2 ♀♀, 20.v.1952, 1600 hours, net in creek bed, 1 ♀, 7.vi.1952, 1600 hours, net in creek bed, E. J. Reye) ; Hornsby (1 ♂, 5.i.1957, 1 ♂, 9.i.1957, light trap, D. J. Lee) ; Glenfield (29.iii.1957, light trap, Keast).

Distribution : Northern Territory, central and south-eastern Queensland, eastern New South Wales.

This widespread species can be distinguished from the similar *unguistyla* n. sp. by the absence of a spot on wing vein R_1, the presence of two well-developed distal spots in cell R_5, and the elongated spot in cell M_1. In addition, the grey wing margin in the female is very conspicuous, the costa in the female never reaches the midpoint of the wing, knee joints are never pale, and the parameres of the male tend to be shorter and very strongly swollen centrally.

The shape of the style in the male of this species varies, in some specimens being very strongly curved basally, as in the allotype, in others (as in the paratype figured, Fig. 35) being much more gently curved. In the type series the latter form predominates, but among the other specimens the former is most common.

5. Alluaudomyia unguistyla n. sp. (Figs 41–45, 52–57)

Types : Holotype ♀, allotype ♂ and 1 ♀ paratype.

Type Locality : Careel Bay, New South Wales (20.ii.1958, light trap, D. J.

Lee). Allotype from Newport, New South Wales (12.xii.1956, light trap, W. Wirth), paratype from Careel Bay (10.iv.1958, light trap, D. J. Lee).

A medium-sized, mottled species, very similar to *fumosipennis* n. sp.

Female: Length 1·70 mm., wing 1·01 × 0·50 mm.

Head brown, vertex light brown, frons ochreous. Eyes bare, contiguous. Mandible with 11–12 teeth. Palpal segments I–II white, III–V pale brown, segment III with a small, shallow preapical pit bearing sensillae (Fig. 52). Antennal segment II brown, segments III–IX light brown with bases broadly paler, X–XV brown (Fig. 53).

Scutum brown, paler laterally, humeral areas yellow with two small brown dots, dorsum with darker brown pattern and dark dots at setal bases, pattern similar to that of *fumosipennis*, scutellum pale yellow but very broadly dark centrally, with 4 setae, postscutellum brown, darker centrally, pleuron light brown to yellowish-brown with a dark central transverse band. Fore coxae and all trochanters yellowish-fuscous, mid and hind coxae brown ; femora and tibiae whitish, the fore femur with a broad brown central band and brown apex, the mid femur with a broad precentral brown band, a narrow preapical brown band and a brown apex, hind femur as in fore but central band narrower, fore tibia with base very narrowly yellowish, narrow sub-basal brown band, broad central brown band and brown apex, mid tibia with base and apex as in fore, a narrow brown band at basal third and one at apical third, hind tibia as in fore but central band narrower (Fig. 55), hind tibial comb of 7–8 spines ; tarsi whitish except hind first tarsal segment brown, distal two segments of all legs fuscous. Claws of all legs unequal, ratio of length of claws to fifth tarsal segment 16 : 7 : 17 in fore and mid, 13 : 4 : 16 in hind (Fig. 57).

Wing (Fig. 41) with extensive dark markings, pattern similar to *fumosipennis*, but a dark spot present on R_1, one spot in cell R_5 much reduced, spot in cell M_1 not elongated, wing margin not shaded grey. Macrotrichia numerous on apical half of wing. Haltere white.

Abdomen brown. Cerci white. Spermathecae (Fig. 43) two, subequal, subspherical, each with a short diverticulum.

Male: Length 1·71 mm., wing 1·10 × 0·36 mm.

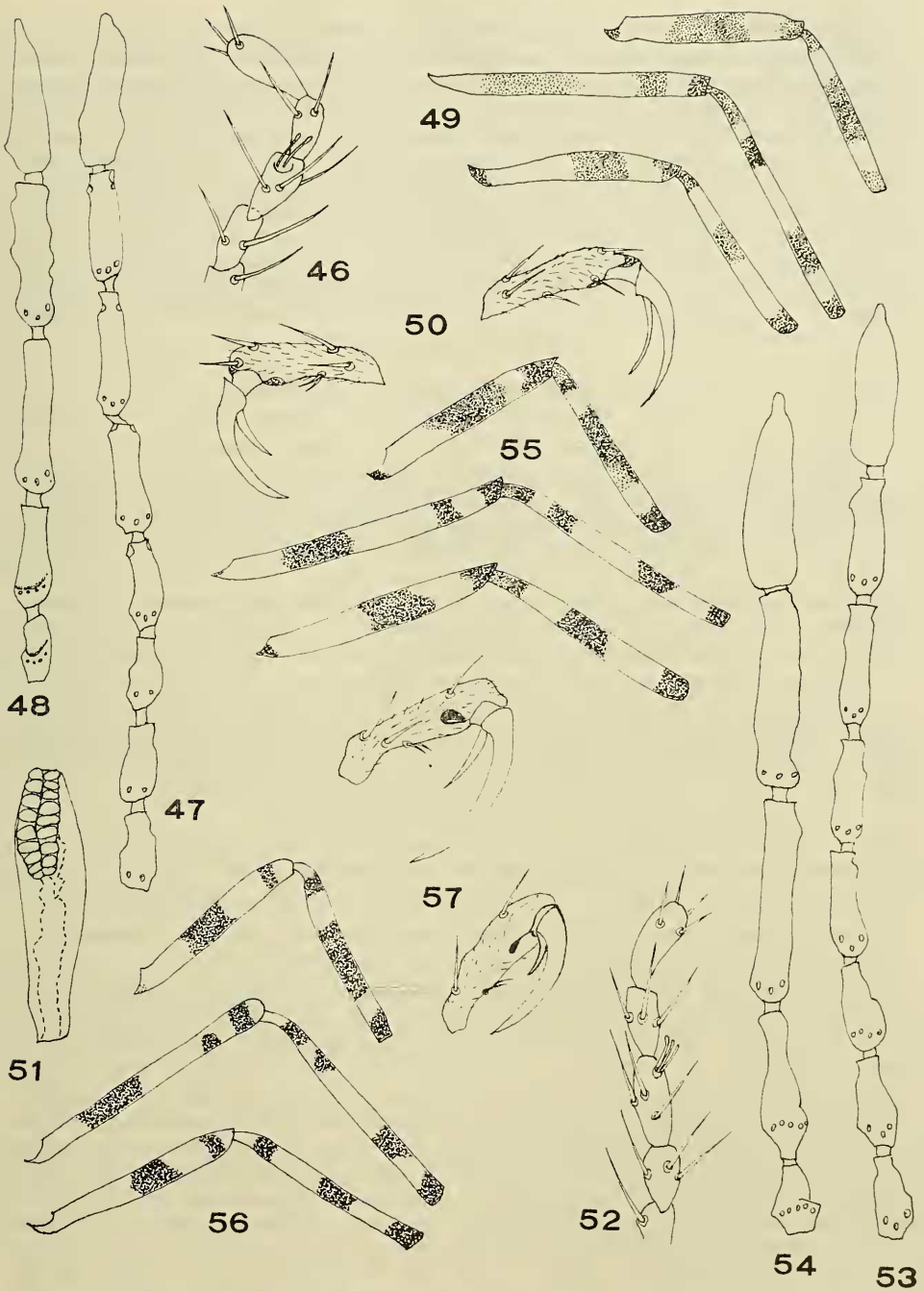
Generally similar to female, differing as follows : Antennal segments III–XI whitish, XII pale basally, brown apically, XIII–XV brown (Fig. 54) ; plume brown.

Pale bases of tibiae more distinct, femora also narrowly yellow apically, so knees conspicuously pale. Claws of all legs equal, simple, half the length of the fifth tarsal segment.

Wing (Fig. 42) with central spot in cell R_5 entirely absent. Macrotrichia restricted to wing margin between the ends of the costa and M_2.

Abdominal tergites brown with posterior edges white, sternites whitish. Hypopygium (Figs 44–45) brown, very similar in appearance to that of *fumosipennis*, but the parameres tend to be longer and not as conspicuously swollen centrally.

Additional specimens: Queensland : Yeerongpilly (1 ♂, 1950, light trap, R. Riek ; 1 ♀, 4.viii.1951, light trap, E. J. Reye) ; Moggill (1 ♀, 4–5.xi.1965, G. L. Cannon) ; Dinmore (1 ♀, 5.xii.1965, light trap, A. L. Dyce and M. D. Murray) ; Coombabah Creek, nr. Pacific Highway (1 ♀, 13.v.1953, 1630 hours, net, E. J. Reye). New South Wales : "Noonameena" Stn. via Bingara (1 ♀, 24.ix.1952, swept in sunlight from above pool, A. L. Dyce ; 1 ♂, 20–24.x.1952, A. L. Dyce) ; Hornsby (1 ♀, 24.ix.1956, 1 ♂, 24.x.1956, 1 ♀, 29.x.1957, light trap, D. J. Lee).



Figs 46–51. *Alluaudomyia fumosipennis*. 46, ♀ maxillary palp, ×350; 47, ♀ antennal segments VIII–XV, ×350; 48, ♂ antennal segments XI–XV, ×350; 49, ♀ femora and tibiae, ×90; 50, ♀ fore (*right*) and hind (*left*) tarsus V and claw, ×350; 51, pupal respiratory trumpet, ×350. Figs 52–57. *Alluaudomyia unguistyle*. 52, ♀ maxillary palp, ×350; 53, ♀ antennal segments VIII–XV, ×350; 54, ♂ antennal segments XI–XV, ×350; 55, ♀ femora and tibiae, ×90; 56, ♀ femora and tibiae (Moggill specimen), ×90; 57, ♀ fore (*upper*) and hind (*lower*) tarsus V and claw (Moggill specimen), ×350.

Distribution : South-eastern Queensland, eastern New South Wales.

This species is very close to *fumosipennis* n. sp., but it can be differentiated by the presence of a dark spot on wing vein R_1 in both sexes, the smaller, more rounded spot in cell M_1, and the reduction of one of the spots in cell R_5, in the female this consisting of at most a small, irregular, linear spot, the male having only a very pale, minute spot, or lacking it entirely. Other characters which may be useful, although less reliable than the preceding, are : much less conspicuous, sometimes absent, grey margin on wing than in *fumosipennis* ; knee joints usually conspicuously pale, but sometimes only slightly so (never pale in *fumosipennis*) ; costa in female reaching to or beyond midpoint of wing (average costal ratio of male also greater than in male of *fumosipennis*, but there is a slight overlap at the extremes of the ranges) ; parameres of male tend to be longer and less strongly swollen centrally.

6. Alluaudomyia immaculata Tokunaga

Alluaudomyia immaculata Tokunaga, 1963, *Pacif. Insects*, *5*: 219 (♂ only).

(Type locality : Kampong Landbouw, Biak, New Guinea.)

Characteristics : A small, pale ochreous species. Head ochreous, eyes bare. Scutum yellow on anterior half, with white humeral areas, ochreous on posterior half, scutellum yellow, with 2 setae, postscutellum ochreous ; legs yellowish, only hind first tarsal segment slightly fuscous, claws all small and equal. Wing with a single pale ochreous spot at the junction of the costa and R_{4+5}, macrotrichia absent. Haltere white. Abdomen very pale brown, hypopygium brown. Aedeagus triangular, with a very shallow basal arch, parameres separate, each with a detached basal arm, apex extended into a long, flattened, tapering process.

Distribution : Known only from the type locality.

Distinguishable from *verecunda* n. sp. by the pale thorax and abdomen, entirely yellow femora and tibiae, and form of the genitalia. In coloration it is closest to *bifasciata* Tokunaga, but it is separated by the absence of fuscous areas on the femora and tibiae, the bare eyes, and the form of the genitalia.

7. Alluaudomyia insulana Tokunaga and Murachi

Alluaudomyia insulana Tokunaga and Murachi, 1959, *Ins. Micronesia*, *12* : 358.

(Type locality : Wena I., Truk, Caroline Is. Allotype from Mt. Unibot, Ton I., Truk ; paratypes from Mwot and Mutunlik, Kusaie, Caroline Is.) ; Tokunaga, 1963, *Pacif. Insects*, *5* : 222 (New Britain).

Characteristics : A small species. Head brown, eyes bare. Scutum brown with yellow and fuscous markings, scutellum yellowish, brown centrally, with 2 setae ; legs yellowish with variable pale brown markings ; femora brown on basal two-thirds to three-fourths, or entirely pale brown except for yellow base, or with broad fuscous central bands, fore tibia pale brown on apical two-thirds to three-fourths, sometimes with a narrow yellow preapical band, or with a broad fuscous median band, mid tibia pale brown with apex dark and brownish clouds at basal and apical third, or pale brown with a broad basal and narrow preapical pale ring, or entirely yellow, hind tibia pale brown with brown cloud before middle and brown apex, or yellow with a broad brown central band and dark apex, or yellow with a small sub-basal fuscous spot and dark apex, female claws unequal, ratio of length of claws to fifth tarsal segment 18 : 17 : 9, male claws all small and equal. Wing with dark spots at junction of costa and R_{4+5} and on R_1, distal parts of Rs and M before r-m cross-veins fuscous, female with a moderate number of macrotrichia on anterior and apical areas of wing, male with macrotrichia sparsely arranged along anterior margin. Haltere pale yellow to white. Abdomen mainly yellow, female with three small brown clouds on tergite III, tergites IV and V with anterior margin brown, tergite VIII brown on

anterior half, male with tergites II–V pale brown with a pair of yellowish spots. Spermathecae two, unequal, slightly pyriform. Aedeagus plate-like, deeply excavated apically giving it the appearance of a fish-tail, parameres with broad, expanded basal process, stems slightly tapering apically, apices bent at right angles, sharply pointed and with a small barb.

Distribution: Caroline Islands, New Britain.

The pale abdomen and distinctive genitalia identify this species.

8. Alluaudomyia verecunda n. sp. (Figs 58–60, 68–70)

Types: Holotype ♂, 1 ♂ paratype.

Type Locality: Maprik, New Guinea (1958).

A small species with only a single conspicuous wing spot, but legs distinctly banded.

Male: Length 1·37 mm., wing 0·71 × 0·28 mm.

Head brown. Eyes bare, just contiguous. Palp very pale brown, segment III stout, with a shallow pit just above centre bearing several sensillae (Fig. 68). Antennal segment II dark brown, flagellar segments lighter brown (Fig. 69); plume dark brown.

Scutum brown, with yellowish areas anteriorly and laterally, scutellum yellow but brown centrally, with 2 setae, postscutellum brown, darker centrally, pleuron brown. Coxae brown, trochanters pale brown; legs pale fuscous yellow, apices of femora and tibiae, sub-basal two-thirds of femora, apical two-thirds of fore tibia and broad central area of hind tibia light brown (Fig. 70), hind tibial comb of 4–5 spines; tarsi whitish but hind segment I brown, base of fore segment I and all fourth and fifth segments fuscous. Claws of all legs small, equal, half the length of the fifth tarsal segment.

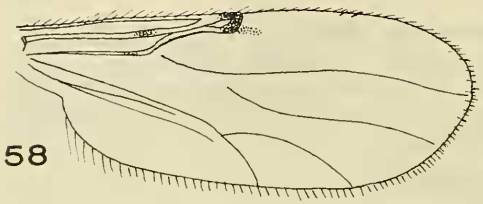
Wing (Fig. 58) with one light brown spot at junction of costa and R_{4+5}, extending slightly on to membrane, parts of Rs, M, M_1 and M_2 streaked with brown. A single row of macrotrichia on the wing margin between the ends of the costa and M_2. Haltere yellowish-white.

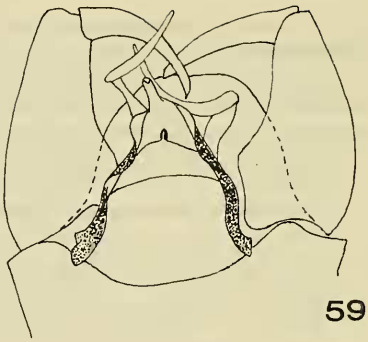
Abdominal tergites dark brown, sternites paler brown, pleuron greyish. Hypopygium (Figs 59–60) dark brown, coxites broad basally, narrow apically, styles pale, short, gently curved; aedeagus deeply arched, with a pair of preapical lateral folds and a short, ventrally bent caudal process, parameres separate, each with a short detached basal arm, base of stem expanded and curved, stem sinuous, apical process very long and tapered.

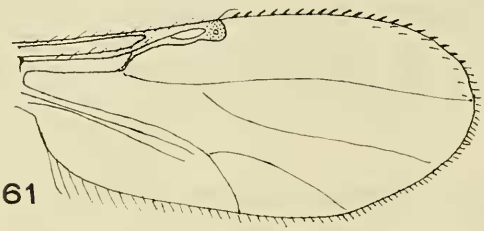
Female: A female specimen from the Bariji River Valley, New Guinea (2,000 ft., nr. Toma, S.S.W. of Popondetta, ix.1964, R. Pullen) resembles the type specimens but is darker, with the brown leg bands much more conspicuous, and the preapical pale bands of the femora narrower. The hind claw is single with a short basal tooth (other claws missing), and the spermathecae lack diverticula. However, as this specimen is badly damaged, it seems advisable to await the collection of further specimens before describing the female.

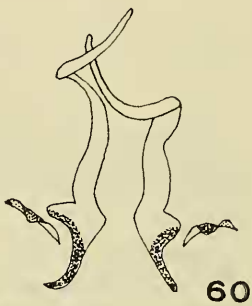
Distribution: New Guinea.

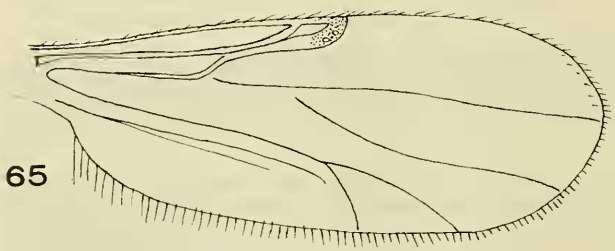
This species is readily distinguished from *immaculata* Tokunaga by its much darker coloration, banded legs, and the form of the male genitalia. The bare eyes, different pattern of leg banding and form of the genitalia separate it from the similarly dark-coloured *papuae* Tokunaga, and the genitalia and dark abdomen differentiate it from *insulana* Tokunaga and Murachi.

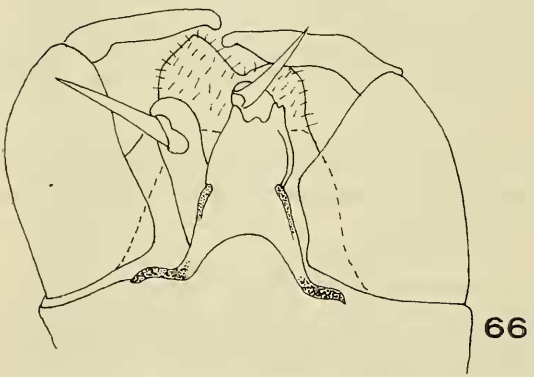


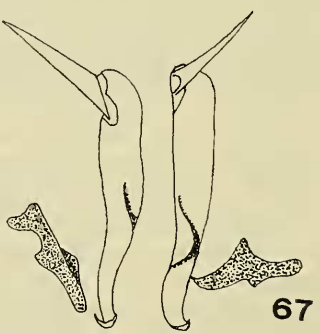


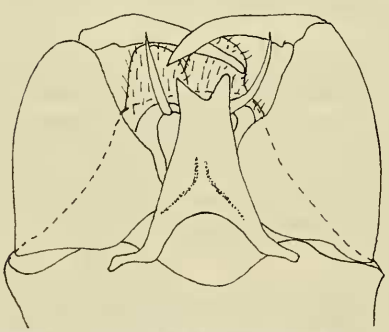


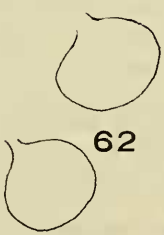












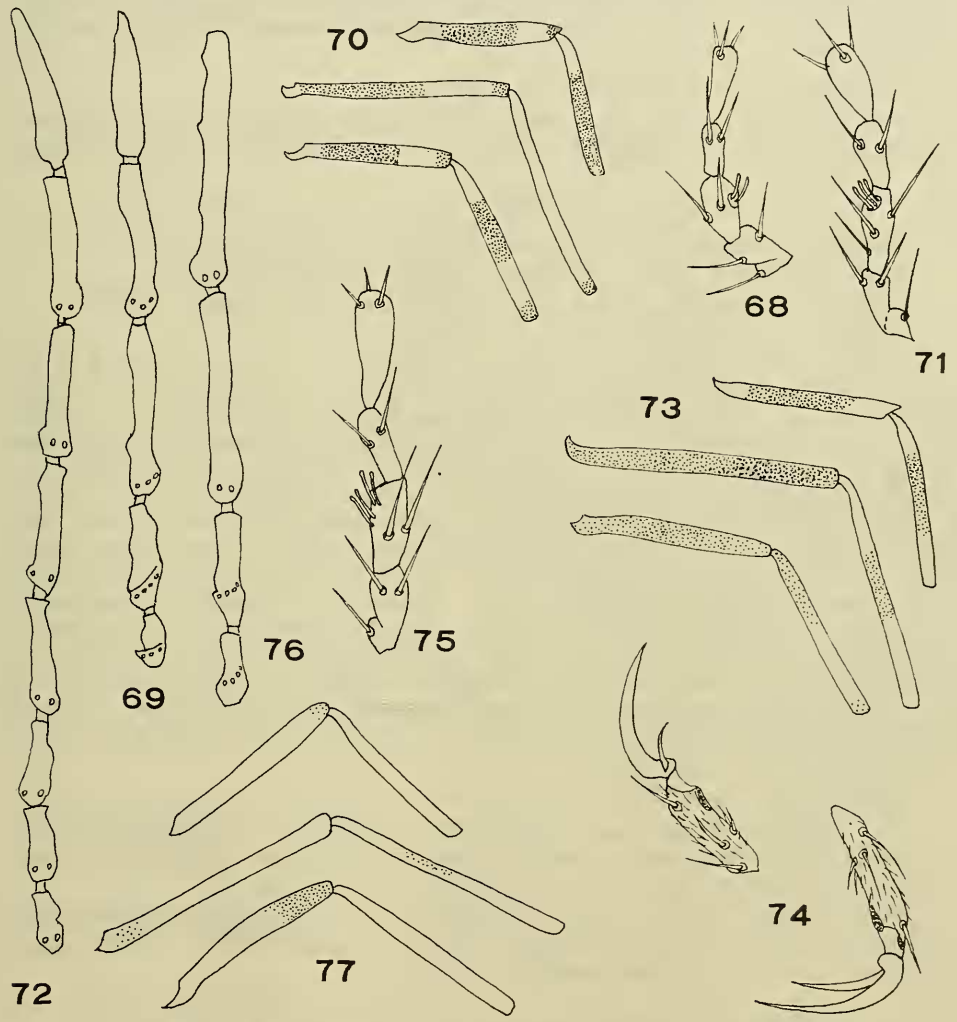
Figs 58–60. *Alluaudomyia verecunda*. 58, ♂ wing, ×90; 59, ♂ hypopygium, ×350; 60, ♂ parameres, ×350. Figs 61–64. *Alluaudomyia papuae*. 61, ♀ wing (Maprik specimen), ×90; 62, ♀ spermathecae (Maprik specimen), ×350; 63, ♂ hypopygium (Maprik specimen), ×350; 64, ♂ parameres (Maprik specimen), ×350. Figs 65-67. *Alluaudomyia bifasciata*. 65, ♂ wing (Musgrave R. specimen), ×90; 66, ♂ hypopygium (Musgrave R. specimen), ×350; 67, ♂ parameres (Musgrave R. specimen), ×350.

9. Alluaudomyia papuae Tokunaga (Figs 61–64, 71–74)

Alluaudomyia papuae Tokunaga, 1963, *Pacif. Insects*, *5* : 217. (Type locality : Keravat, New Britain. Allotype from Maprik, New Guinea ; paratype from Bainyik, New Guinea.)

Specimens examined : New Guinea : Maprik (11 ♂♂, 7 ♀♀, 1958 ; 1 ♂, 2 ♀♀, iv.1958 ; 6 ♂♂, 2 ♀♀, 6.vii.1958) ; Nineia, Morobe District (2 ♀♀, 10.v.1960, aspirated from rock ledges, Sowat R., B. McMillan).

Characteristics : A small species with wings unmarked except for a pale yellowish spot at the end of the costa. Head dark brown, frons and proboscis paler, eyes pubescent. Thorax almost entirely dark brown but scutellum yellow



Figs 68–70. *Alluaudomyia verecunda*. 68, ♂ maxillary palp (paratype), ×350 ; 69, ♂ antennal segments XI–XV, ×350 ; 70, ♂ femora and tibiae, ×90. Figs 70–74. *Alluaudomyia papuae*. 71, ♀ maxillary palp (Maprik specimen), ×350 ; 72, ♀ antennal segments VIII–XV (Maprik specimen), ×350 ; 73, ♀ femora and tibiae (Maprik specimen), × 90 ; 74, ♀ fore (*right*) and hind (*left*) tarsus V and claw (Maprik specimen), ×350. Figs 75–77. *Alluaudomyia bifasciata*. 75, ♂ maxillary palp (Musgrave R. specimen), ×350 ; 76, ♂ antennal segments XI-XIV (Musgrave R. specimen), ×350 ; 77, ♂ femora and tibiae (Musgrave R. specimen), ×90.

with a dark median spot and 2 setae ; legs yellowish, with fuscous to brown clouds, markings more pronounced in female (Fig. 73), female claws (Fig. 74) unequal, ratio of length of claws to fifth tarsal segment 20·7 : 12·7 : 19·7 in fore, 24 : 15·7 : 20·7 in mid, 14·7 : 9·3 : 18·3 in hind, male claws all small and equal. Wings very pale, with a single very pale yellowish spot over the end of the costa, female without macrotrichia but with a row of spinulose setae on the anterior edge (Fig. 61), male with a few macrotrichia on the anterior edge. Haltere white. Abdominal tergites mainly dark brown, but II white, VI–VII fuscous, and in female posterior half of V and sometimes anterior half of VIII fuscous, sternites pale. Spermathecae (Fig. 62) two, brown, spherical or subspherical, subequal, sometimes also a third, vestigial, round. Aedeagus large, strongly sclerotized, with a V-shaped apical notch, parameres separate, expanded centrally, with a hook-like apex and a slender, tapering subapical process (Figs 63–64).

Distribution : New Britain, New Guinea.

This species is distinguished from the allied species *bifasciata* by its darker coloration, spinulose setae on the female wing, and form of the male genitalia.

10. Alluaudomyia bifasciata Tokunaga. (Figs 65–67, 75–77)

Alluaudomyia bifasciata Tokunaga, 1963, *Pacif. Insects*, *5* : 220. (Type locality : Keravat, New Britain. Allotype from Waris, West Irian.)

Specimen examined : New Guinea : Musgrave R. nr. Port Moresby (1 ♂, 25.ii.1964, D. H. Colless). Allotype ♂ also examined.

Characteristics : Small, pale brown to ochreous species, wing with a single pale spot at the end of the costa. Head pale ochreous, eyes pubescent. Thorax pale brown or ochreous with humeral areas yellowish, scutellum pale yellow with a fuscous median spot and 2 setae ; legs yellow, mid femur slightly fuscous sub-basally and/or apically, hind femur fuscous apically (Fig. 77). Female claws unequal, ratio of length of claws to fifth tarsal segment 19·5 : 12·5 : 21·5 in fore, 20·5 : 12 : 20·5 in mid, 16·5 : 7·5 : 20 in hind, male claws all small and equal. Wing (Fig. 65) with a single pale ochreous spot at the end of the costa, female with a moderate number of macrotrichia at the wing apex, male with only a few macrotrichia. Haltere white. Abdomen of female with segments I–II and V–VI mainly white, III–IV and VII–IX mainly fuscous, but anterior part of V fuscous and anterior part of VII white, abdomen of male with I ochreous or pale brown, II white to yellow, III–IV or V and VIII–IX brown, V or VI–VII pale yellow. Spermathecae two, round, equal. Aedeagus large, with a W-shaped apical excavation, parameres separate, each with a flattened, tapering apicolateral process (Figs 66–67).

Distribution : New Britain, West Irian, New Guinea.

The Musgrave R. specimen lacks the strong spines on the coxite which are present in the allotype, but is otherwise similar. The costal ratio of the allotype is 0·53, not 0·43 as recorded in the original description.

This species is allied to *papuae* Tokunaga, but is distinguished by its paler coloration, absence of spinulose setae and presence of macrotrichia on the female wing, and form of the male genitalia.

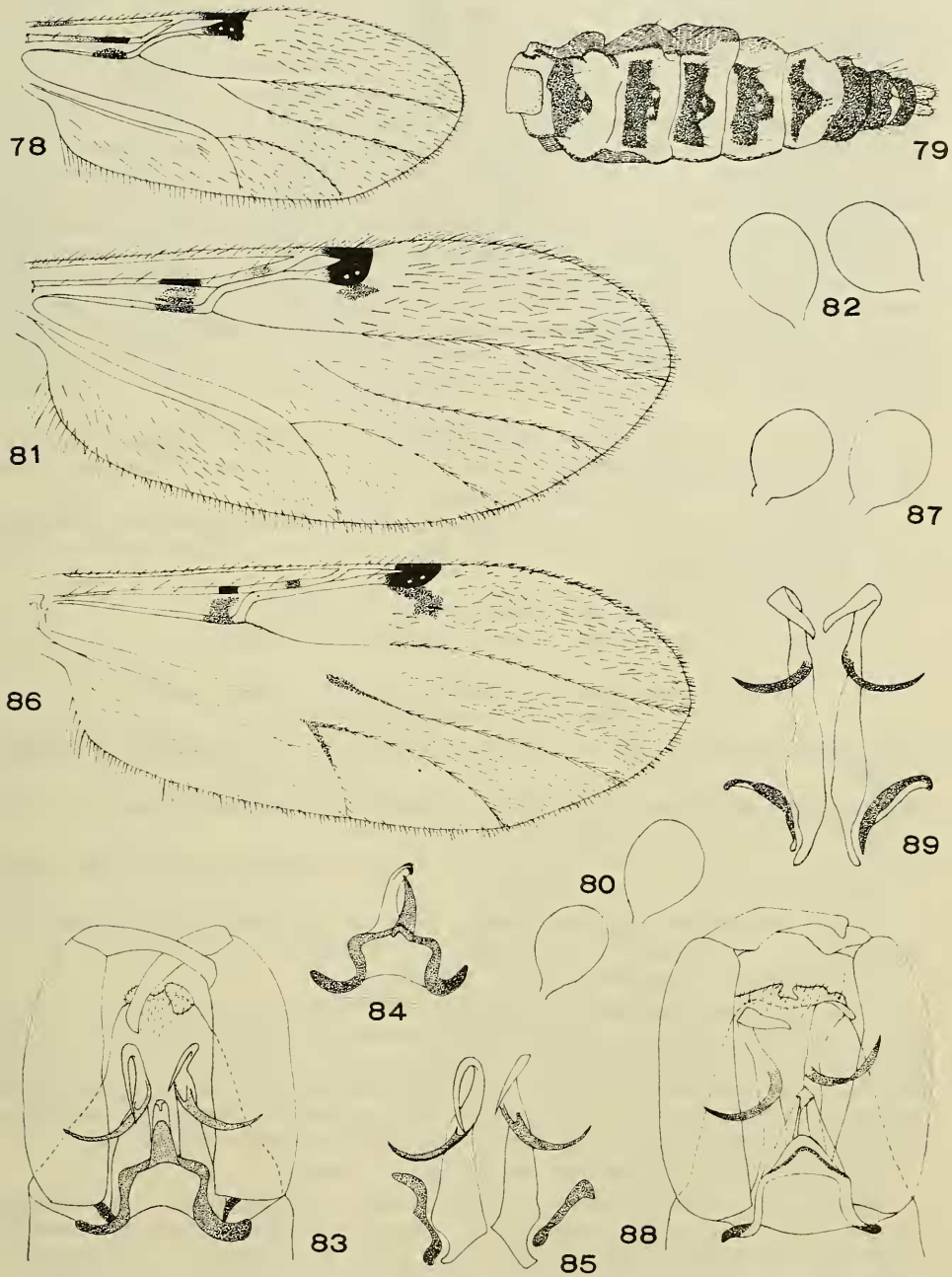
11. Alluaudomyia alpina n. sp. (Figs 78–80, 102–106)

Types : Holotype ♀ and 1♀ paratype.

Type Locality : Alpine Creek, Kiandra, N.S.W. (2.ii.1965, D. Colless).

A small, very dark species, the legs with narrow pale bands. Male unknown.

Female : Length 1·44 mm., wing 1·13 × 0·36 mm.



Figs 78–80. *Alluaudomyia alpina*. 78, ♀ wing, ×55; 79, ♀ abdomen (paratype), ×55; 80, ♀ spermathecae (paratype), ×200. Figs 81–85. *Alluaudomyia latipennis*. 81, ♀ wing (Hornsby specimen), ×55; 82, ♀ spermathecae (Hornsby specimen), ×200; 83, ♂ hypopygium (Nattai R. specimen), ×200; 84, ♂ aedeagus, with apical processes twisted laterally showing curvature (Hornsby specimen), ×200; 85, ♂ parameres (Nattai R. specimen), ×200. Figs 86–89. *Alluaudomyia appendiculata*. 86, ♀ wing, ×55; 87, ♀ spermathecae (paratype), ×200; 88, ♂ hypopygium (paratype), ×200; 89, ♂ parameres, ×200.

Head dark brown. Eyes bare, contiguous, mandibular teeth 9. Palp with proximal segments light brown, distal segments darker, segment III with a small subapical pit bearing a few long sensillae (Fig. 102). Antennal segment II dark brown, flagellar segments brown, IV–VII whitish basally (Fig. 103).

Scutum dark blackish-brown, humeral areas light brown, two large spots near each lateral margin also paler, scutellum broadly dark brown centrally, paler laterally, with 4 setae, postscutellum blackish-brown, pleuron dark brown. Fore coxa and fore and mid trochanters light brown, mid and hind coxae and hind trochanter dark brown ; femora and tibiae largely dark brown, the fore femur with base paler and a very narrow light brown preapical band, mid and hind femora with slightly broader pale preapical bands, fore and mid tibiae with light brown sub-basal and preapical bands, hind tibia with similar but broader bands (Fig. 104), hind tibial comb of 8 spines ; hind tarsal segment I brown, remaining tarsi pale fuscous, apices of segments I and II and all of III, IV and V darker. Claws of all legs very unequal, ratio of length of claws to fifth tarsal segment 16·5 : 8 : 19 in fore, 16 : 6 : 17 in mid, and 15 : 6 : 18 in hind (Fig. 105).

Wing (Fig. 78) with many macrotrichia on apical half and in anal area. Two wing spots, one at junction of costa and R_{4+5}, and one before r-m, veins slightly brownish. Haltere pale fuscous.

Abdominal segments, except last three, white with a large, broad, T-shaped spot, distal three segments brown (Fig. 79). Cerci white. Spermathecae two, oval, subequal (Fig. 80).

Distribution : Known only from the type locality.

The very dark legs of this species are quite distinctive.

12. Alluaudomyia latipennis (Skuse), comb. nov.
(Figs 81–85, 90–95, 107–113)

Ceratopogon latipennis Skuse, 1889, Proc. Linn. Soc. N.S.W., *4* (2nd series) : 308.

Didymorphleps latipennis (Skuse) Kieffer, 1906, *Genera Insectorum*, fasc. *42* : 56 ; 1917, *Ann. Mus. Nat. Hung.*, *15* : 193.

Bezzie latipennis (Skuse) Kieffer, 1906, *Genera Insectorum*, fasc. *42* : 193 ; Lee, 1948, Proc. Linn. Soc. N.S.W., *73* : 340.

Type : Holotype ♀, in the Macleay Museum, University of Sydney. All that remains of the type is a single mid leg (not hind leg, as stated by Lee).

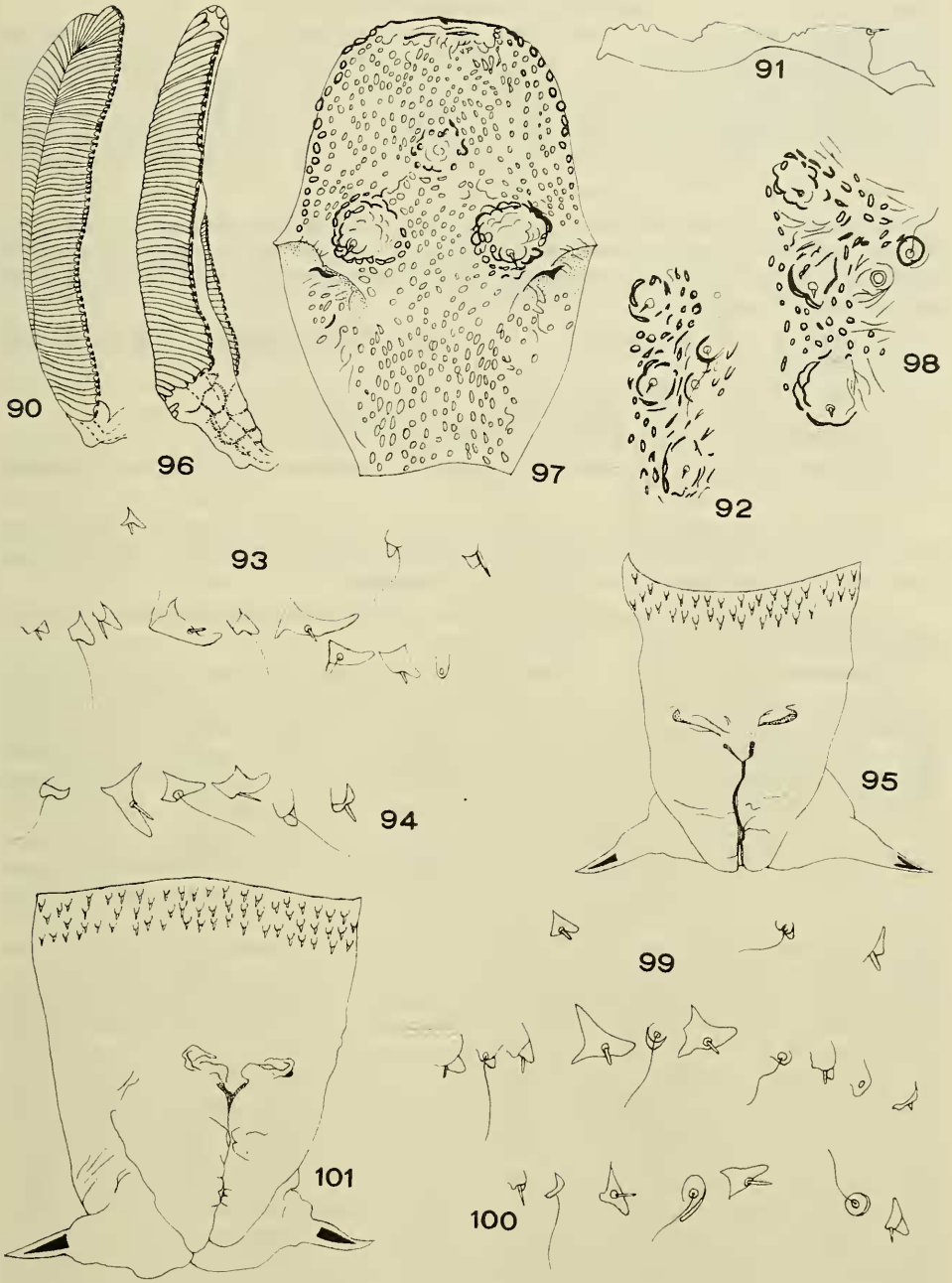
Type Locality : Berowra, N.S.W. (Masters).

It is apparent from Skuse's diagram and description that *latipennis* is a species of *Alluaudomyia*. A number of specimens in the collections of the S.P.H. and T.M. and the McMaster Laboratory, C.S.I.R.O. Division of Animal Health, agree very closely with the original description and are considered to be conspecific with *latipennis*. The species is here redescribed from a selected female and male collected at Hornsby, N.S.W., which is near the type locality.

Female : Length 2·02 mm., wing 1·53 × 0·69 mm.

Head light yellowish-brown. Eyes bare, just separated. Mandibular teeth 15–16. Palp slender, pale brown, segment III with a preapical sensory pit bearing several long sensillae (Fig. 107). Antennal segments II–III brownish-ochreous, segments IV–X whitish on basal half, light brown on apical half, XI–XIV light brown with base whitish, XV light brown (Fig. 108).

Scutum fuscous yellow, without pattern, scutellum fuscous yellow but brown centrally, with 4 strong setae, postscutellum brown, more yellowish laterally, pleuron fuscous yellow. All coxae fuscous yellow, trochanters fuscous ; all femora and tibiae pale yellowish-white, femora with apex brown, hind femur



Figs 90–95. *Alluaudomyia latipennis*, pupa. 90, ♂ respiratory trumpet (Nattai R. specimen). ×200; 91, profile of operculum, ×200; 92, dorsal tubercles of cephalothorax, ×200; 93, tubercles of 7th abdominal segment (Hornsby specimen), ×200; 94, tubercles of 8th abdominal segment (Hornsby specimen), ×200; 95, ♂ anal segment (Nattai R. specimen), ×200. Figs 96–101. *Alluaudomyia appendiculata*, pupa. 96, ♀ respiratory trumpet, ×200; 97, operculum (paratype), ×200; 98, dorsal tubercles of cephalothorax, ×200; 99, tubercles of 7th abdominal segment, ×200; 100, tubercles of 8th abdominal segment, ×200; 101, ♂ anal segment (paratype), ×200.

also with a broad, very pale fuscous sub-basal band, all tibiae with apex brown, fore tibia also with a narrow sub-basal brown band and broad, very faint fuscous central band, mid tibia with base brown, hind tibia with a pale fuscous central band (Fig. 110), hind tibial comb of 8–9 spines ; tarsi whitish except for distal two segments on all legs, which are pale fuscous, and hind segment I, which is light brown. Claws of fore and mid legs unequal, those of hind legs very unequal, ratio of length of claws to fifth tarsal segment 34 : 17 : 27 in fore, 33 : 16 : 27 in mid, and 25 : 9 : 24 in hind (Fig. 112).

Wing (Fig. 81) with numerous macrotrichia on apical half and in anal area. Three wing spots, one just before r-m, one on R_1, and one at the junction of the costa and R_{4+5}, the latter extending slightly on to cell R_5. Haltere with stalk white, knob fuscous.

Abdomen yellowish-brown. Cerci white. Spermathecae two, oval, subequal (Fig. 82).

Male: Length 1·87 mm., wing 1·27 × 0·48 mm.

Generally similar to female, differing as follows :

Antennal plume pale brown, flagearll segments III–XII pale yellow, XII–XVI brown (Fig. 109).

Legs lacking pale fuscous areas on fore tibia and hind femur, but central band on hind tibia darker. Claws all paired, equal and simple, slightly more than half the length of the fifth tarsal segment.

Wing with fewer macrotrichia, these restricted to the anterior edge and apical fourth of the wing. Haltere white.

Abdomen light brown. Hypopygium (Figs 83–85) light yellowish-brown, coxites long, narrow, styles short and scarcely curved, with rather blunt apices. Aedeagus with a low, squared basal arch and a pointed, dorsally curved apical process, caudal lobe long and narrow, ventrally curved ; parameres expanded and just touching basally, each with a detached basal arm, apex elongated into a narrow, tapering process, a similar process arising subapically.

Pupa: Light yellowish-brown, dorsum of thorax darker. Respiratory trumpet pale to dark brown, 0·25 mm. long in female, slightly longer in male, with about 45 pairs of spiracles in female and 65–75 pairs in male, arranged obliquely along most of its length (Fig. 90). Operculum similar to that of *appendiculata* n. sp. (see Fig. 97), median tubercle without spine, placed well back from distal margin, a.m. tubercles situated between lateral corners, each with a short, basally directed spine, rest of surface without spines, but with very small tubercles, these most prominent around the bases of the a.m.'s and on the distal margin (Fig. 91). Dorsal tubercles of cephalothorax situated as figured, 1, 2 and 3 with very short, stout spines, 4 with a long fine seta, 5 with pore only (Fig. 92). Tubercles of abdominal segments 3–7 as figured, d.a.s.m. 2 and l.a.s.m. small with a short, stout spine, d.a.s.m. 1 with a long, fine seta, of d.p.m.'s 5 absent, 4 and 3, when present, represented by pores only, 1 and 2 of intermediate size, 2 with a short spine and 1 with a long seta, l.p.m.'s 1 and 3 large, with a short spine, 2 small, with a long seta, v.p.m.'s of small to medium size, 1 and 3 with a short spine, 2 with a long seta (Fig. 93). Tubercles of 8th abdominal segment as figured, d.a.s.m.'s and l.a.s.m. absent, as are v.p.m.'s 1 and 3, otherwise similar to preceding segment (Fig. 94). Anal segment with spines in a basal band of 2–3 rows (Fig. 95).

Specimens examined: New South Wales : Mt. Dromedary (2 ♂♂, 9 ♀♀, 24.xi.1965, light trap, I. F. B. Common and M. Upton) ; Hornsby (2 ♀♀, pinned, 11.iv.1956, 1 ♀, pinned, 16.ix.1956, 1 ♂, 1 ♀, both pinned, 19.ix.1956, 1 ♂, 23.ix.1956, 1 ♂, 28.ix.1956, 1 ♀, 3.x.1956, 5 ♀♀, 8.x.1956, light trap, D. J. Lee ; 1 ♀, 9.x.1956, bred from pupa ex wet rock face, D. J. Lee and W. W. Wirth ;

2 ♂♂, 24.x.1956, 1 ♂, 25.x.1956, 1 ♂, 26.x.1956, 1 ♀, 10.xii.1956, 1 ♀, 30.x.1957, light trap, D. J. Lee) ; Stockyard Creek, Colo Vale (1 ♀, 26.x.1954, 1845–2000 hours, suction light trap, A. L. Dyce) ; Nattai River, Mittagong (1 ♀, 7.i.1964, light trap, D. J. Lee ; 1 ♂, 4.xi.1964, bred ex pupa, D. J. Lee and L. Smee ; 1 ♂, 15.xi.1968, bred ex pupa, D. J. Lee and M. L. Debenham).

Distribution : New South Wales.

The coloration and leg banding in this species is quite variable. In the Hornsby specimens the thorax ranges from fuscous yellow to ochreous brown, in the Colo Vale specimen it is ochreous yellow, in the Nattai River specimens yellow with fuscous clouds and a greenish tinge, and in the Mt. Dromedary specimens dark, slightly ochreous brown, sometimes with a greenish tinge. The legs are generally almost entirely pale, often with faint fuscous markings, but in the Mt. Dromedary specimens the markings are quite distinct (Fig. 111).

The paler forms of this species are readily recognizable by the almost entirely pale legs. The darker forms resemble *appendiculata* n. sp. but can be distinguished by the pale bases on all femora, the absence of a distinct preapical band on the mid tibia, and the different genitalia.

13. Alluaudomyia appendiculata n. sp. (Figs 86–89, 96–101, 114–120)

Types : Holotype ♂, allotype ♀, 17 ♂♂ and 11 ♀♀ paratypes.

Type Locality : Hornsby, N.S.W. (holotype 28.ix.1956, light trap, D. J. Lee, allotype 9.x.1956, bred from pupa ex wet rock face, D. J. Lee and W. W. Wirth). Paratypes from Hornsby (1 ♀, pinned, 6.ix.1956, D. J. Lee and W. W. Wirth ; 1 ♂, 24.ix.1956, light trap, D. J. Lee ; 1 ♂, same data as holotype ; 1 ♂, 8.x.1956, light trap, D. J. Lee ; 2 ♂♂, 5 ♀♀ (3 ♀♀ pinned), same data as allotype ; 1 ♂, 10.x.1956, 1 ♂, 24.x.1956, 1 ♂, 1 ♀, 25.x.1956, 2 ♂♂, 26.x.1956, light trap, D. J. Lee ; 1 ♀, 22.x.1957, light trap, 300 ft., D. J. Lee ; 1 ♂, 28.x.1957, light trap, D. J. Lee ; 1 ♂, 29.x.1957, light trap, 300 ft., D. J. Lee) and Asquith, N.S.W. (2 ♂♂, 2 ♀♀, 19.xi.1965, 3 ♂♂, 1 ♀, 22.xii.1965, light trap, A. L. Dyce).

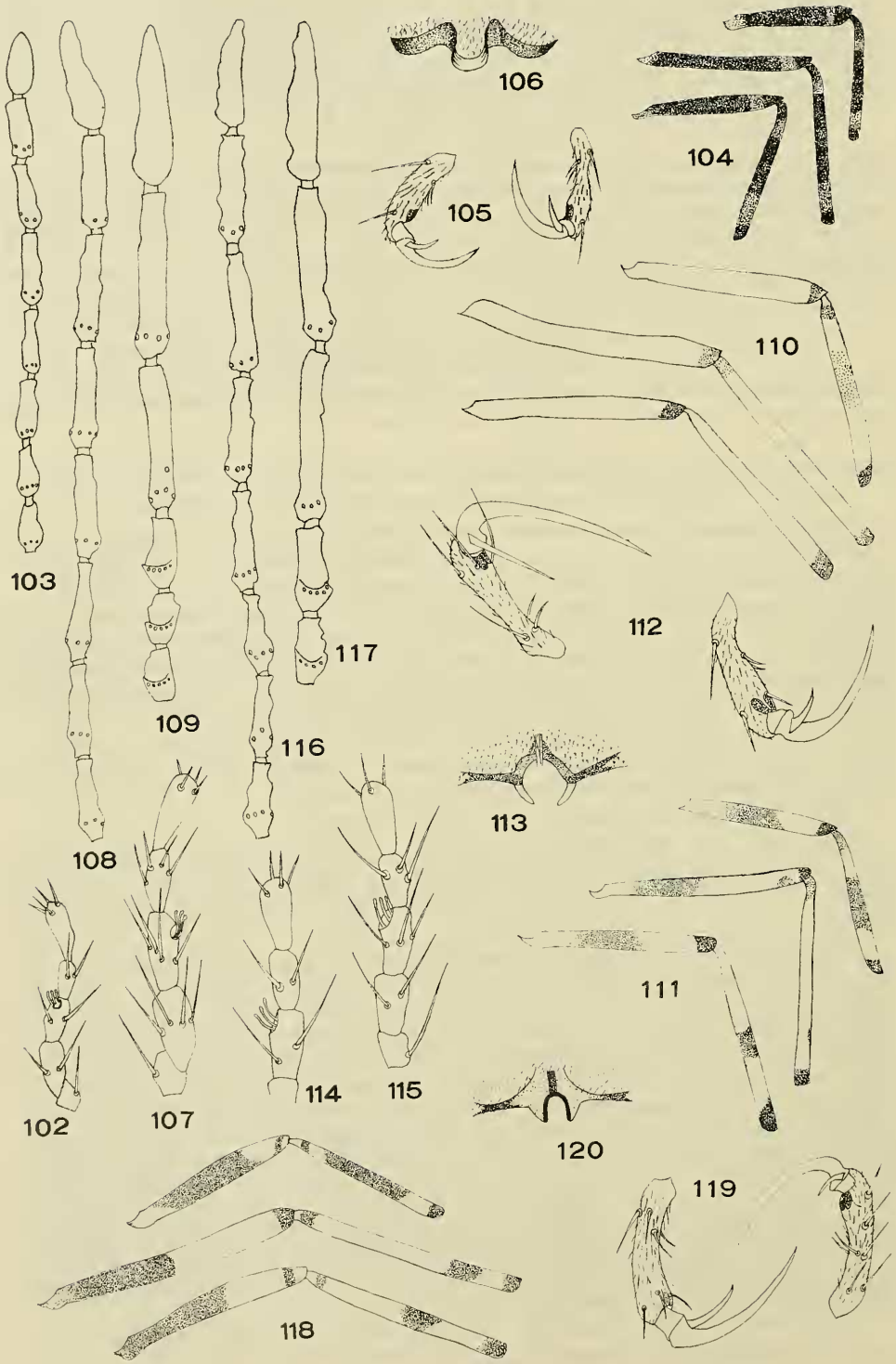
A large brown and yellow species, with legs distinctly banded, and the wing spot at the apex of the costa extending on to cell R_5.

Male : Length 2·62 mm., wing 1·42 × 0·49 mm.

Head brown. Eyes bare, contiguous. Palp light brown, segment III with a shallow preapical pit bearing several long sensillae (Fig. 115). Antennal segment II ochreous, III–XII very pale, XIII–XV brown (Fig. 117) ; plume brown.

Scutum yellowish-brown on anterior half with a large brown spot on posterior half, humeral areas whitish-yellow, scutellum yellow, dark fuscous centrally, with 4 setae, postscutellum and pleuron brown. Fore and mid coxae yellowish, hind coxa and all trochanters brown ; femora and tibiae yellow, the fore femur fuscous basally, broadly brown centrally, and with a brown preapical ring, mid femur brown on basal half and at apex, hind femur brown on basal half and with a brown preapical ring, fore tibia with a brown sub-basal ring, broadly brown centrally, apex brown, mid tibia with a brown sub-basal ring, a narrow brown preapical band and a brown apex, hind tibia with a brown sub-basal ring, a brown incomplete central band and a brown apex, hind tibial comb of 8 spines ; tarsi whitish but apices of segments I, II and III on fore and mid legs and segments II and III on hind leg fuscous, basal sixth of mid segment I and all of hind segment I brown, segments IV and V of all legs entirely fuscous. Claws of all legs small, equal, just over half the length of the fifth tarsal segment, each with a minute external basal tooth.

Wing with three brown spots, one just before r-m cross-vein, one on R_1, and one at junction of costa and R_{4+5}, the latter extending posteriorly for some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distance into cell R_5, veins streaked with brown. Macrotrichia restricted to the anterior edge and apex between the ends of the costa and M_{3+4}. Haltere white.

Abdominal tergites brown except for the distal edge and posterolateral two-thirds, which are white, anterior sternites white, posterior sternites light brown on anterior half, pleural membranes white. Hypopygium (Figs 88–89) dark brown, coxites long and slender, styles whitish, short and rather stout; aedeagus deeply arched, with a long, pointed apical lobe, parameres separate, with a short, arcuate, detached basal arm, a long tapering subapical process and a broad, flattened, tapered apical extension.

Female: Length 2·25 mm., wing 1·62 × 0·64 mm.

Generally similar to male, differing as follows:

Colouring more yellowish. Eyes just contiguous. Mandibular teeth 12 large, 6 small. Segments I–III of palp (Fig. 114) whitish. Antennal segments brown, the basal ones paler, all except XV with base whitish (Fig. 116).

Scutum more yellowish, scutellum entirely yellow. Legs (Fig. 118) banded as in male. Claws of fore and mid legs unequal, those of hind leg very unequal, ratio of length of claws to fifth tarsal segment 20 : 10 : 25 in fore, 27 : 13 : 29 in mid, 25 : 8 : 25 in hind (Fig. 119).

Macrotrichia of wing (Fig. 86) much more extensive, covering apical half and part of the anal area. Brown streaking particularly prominent at base of M_2.

Abdomen more yellowish. Cerci white. Spermathecae (Fig. 87) two, subspherical, subequal, each with a short neck.

Pupa: Pale brown, thorax darker dorsally. Respiratory trumpet light to dark brown, approximately 0·26 mm. long, with 50–60 pairs of spiracles extending obliquely along most of its length (Fig. 96). Median tubercle of operculum without spine, situated well back from the distal edge, a.m. tubercles situated between lateral corners, each with a short, basally directed spine, rest of surface without spines but with very small tubercles as described for *latipennis* (Skuse) (Fig. 97). Dorsal tubercles of cephalothorax as figured, 1, 2 and 3 with very short, stout spines, 4 with a long, fine seta, 5 with pore only (Fig. 98). Tubercles of abdominal segments 3–7 as figured, d.a.s.m. 2 and l.a.s.m. small, with a blunt spine, d.a.s.m. 1 with a long seta, d.p.m. 5 absent, 4 with a very short spine, 3 with pore only, 2 with a blunt spine and 1 with a fine seta, l.p.m.'s 1 and 3 large, with a short, blunt spine, 2 smaller, with a long seta, b.p.m.'s also smaller, 1 and 3 with a short, blunt spine, 2 with a long seta (Fig. 99). Tubercles of 8th abdominal segment similar, but d.a.s.m.'s and l.a.s.m. absent, as are d.p.m.'s 3 and 4 and v.p.m. 1 (Fig. 100). Anal segment with basal band of spines in 2–3 rows (Fig. 101).

Additional specimens: Queensland: Ravenshoe, nr. Tully Falls (1 ♀, 4.viii.1967, light trap, R. Ellis and L. Hawkins); Mt. Crosby (1 ♀, in alcohol.

Explanation of Text figs. 102-120

Figs 102-106. *Alluaudomyia alpina.* 102, ♀ maxillary palp, × 200; 103, ♀ antennal segments VIII–XV, × 200; 104, ♀ femora and tibiae, × 55; 105, ♀ fore (*right*) and hind (*left*) tarsus V and claw, × 200; 106, ♀ genital sclerotization (paratype), × 200. Figs 107–113. *Alluaudomyia latipennis.* 107, ♀ maxillary palp (Hornsby specimen), × 200; 108, ♀ antennal segments VIII–XV (Hornsby specimen), × 200; 109, ♂ antennal segments X–XV (Nattai R. specimen), × 200; 110, ♀ femora and tibiae (Hornsby specimen), × 55; 111, ♀ femora and tibiae (Mt. Dromedary specimen), × 55; 112, ♀ fore (*left*) and hind (*right*) tarsus V and claw (Hornsby specimen), × 200; 113, ♀ genital sclerotization (Hornsby specimen), × 200. Figs 114–120. *Alluaudomyia appendiculata.* 114, ♀ maxillary palp, × 200; 115, ♂ maxillary palp, segments III–V, × 200; 116, ♀ antennal segments VIII–XV, × 200; 117, ♂ antennal segments XI–XV, × 200; 118, ♀ femora and tibiae, × 55; 119, ♀ fore (*left*) and hind (*right*) tarsus V and claw, × 200; 120, ♀ genital sclerotization, × 200.

4.xii.1965, dusk–1.30 a.m., below dam bank amongst lantana, light trap, A. L. Dyce; 4 ♂♂, 2 ♀♀, all except 1 ♂ in alcohol, 5.xii.1965, dusk-dawn, Lake Manchester Rd., 250 yds. from Brisbane Rd., in narrow, well-grassed, timbered gully, light trap, A. L. Dyce and M. D. Murray); Goodar Crossing, Weir River (1 ♂, 28.iii.1953, suction light trap, 1730–2130 hours, W. E. Poole); Noondoo (1 ♀, 16.xii.1963, light trap, A. L. Dyce and M. D. Murray); Yelarbon (3 ♂♂, 27.iii.1952, 1800–2115 hours, suction light trap, W. E. Poole). New South Wales: Yagobie Crossing (2 ♀♀, 3.xi.1951, suction light trap, 1920–2100 and 2315–0200 hours, A. L. Dyce); Bundy via Moree (1 ♀, 20.v.1952, 1600 hours, net in creek bed, E. J. Reye); "Noonameena" Station via Bingara (1 ♀, 24.ix.1952, swept in sunlight above pool, 1 ♀, 6.x.1952, swept from creek bank, A. L. Dyce); Bruxner Park, Coffs Harbour (3 ♀♀, 1.xi.1965, light trap, M. Upton); Otford (1 ♀, 5.iii.1969), bred ex pupa from mud, M. L. Debenham, R. Russell and J. Citowitsch); Colo Vale (1 ♀, 17.xi.1954, suction light trap, 1930–2030 hours, A. L. Dyce); Nattai River, Mittagong (2 ♂♂, 25.x.1968, D. J. Lee and M. L. Debenham); Minnamurra Falls (1 ♀, 16.xi.1960, M. Upton). Australian Capital Territory: Black Mountain (1 ♂, 17.x.1960, light trap, I. F. B. Common); Canberra (1 ♂, 29.iv.1963, light trap, I. F. B. Common).

Distribution: Queensland, New South Wales, A.C.T.

The thoracic coloration of this species is very variable, ranging from yellow with very pale fuscous markings to entirely dark brown. Sometimes a greenish tinge is present.

This species can be distinguished from the paler specimens of *latipennis* (Skuse) by the presence of distinct banding on the femora and tibiae, and from the darker specimens by the dark bases of the mid and hind femora and the presence of a distinct preapical brown band on the mid tibia, as well as by the different form of the aedeagus and the much broader apical lobe of the parameres. It is distinguished from the male of *varia* n. sp. by the absence of dark punctations in the humeral areas, the relatively narrow, well-defined preapical band of the mid tibia and the form of the genitalia.

14. Alluaudomyia varia n. sp. (Figs 121–131)

Types: Holotype ♂, allotype ♀ (both in A.N.I.C.), 7 ♂♂ and 1 ♀ paratypes.

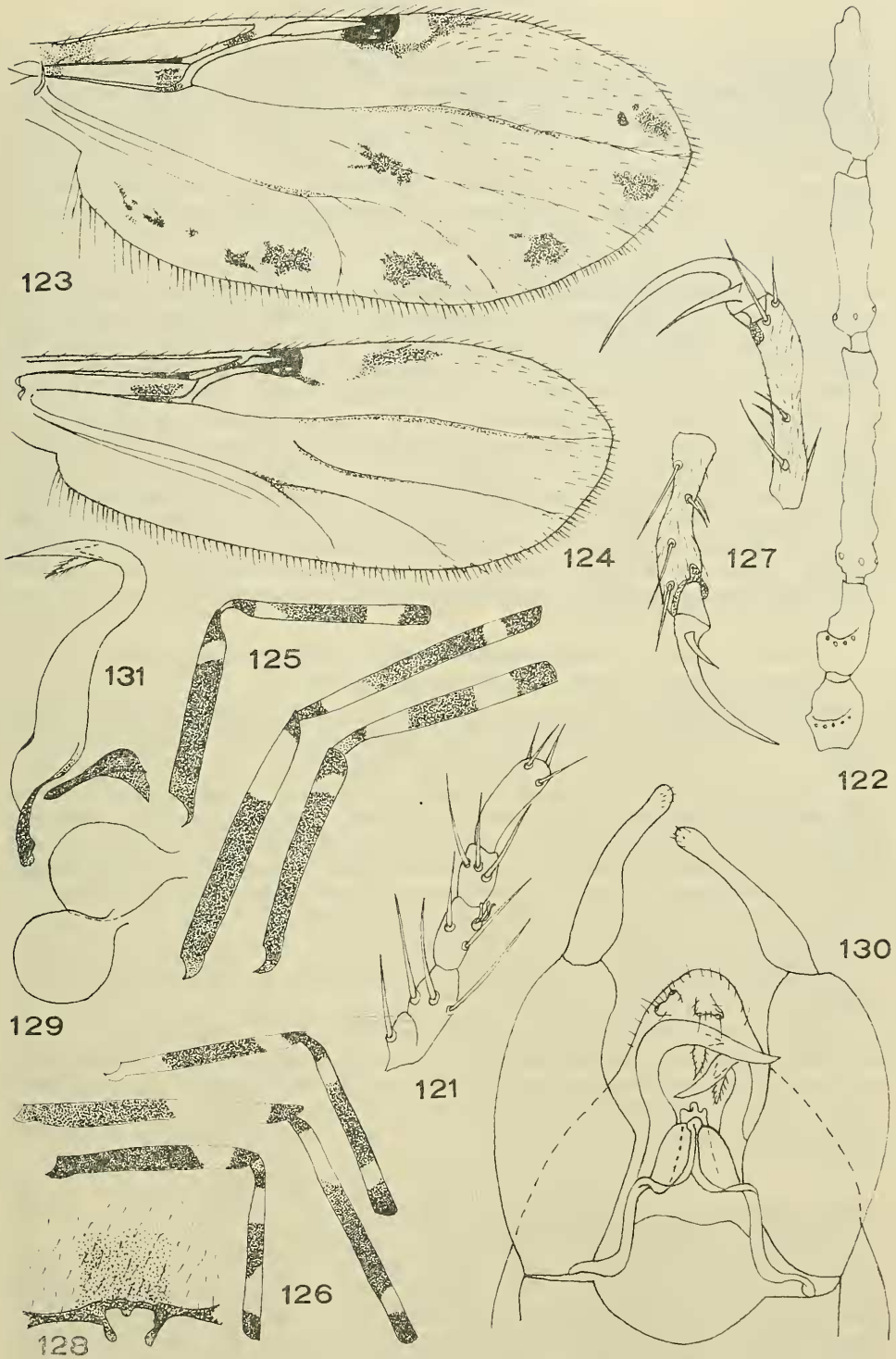
Type Locality: Yelarbon, Queensland (27.iii.1952, suction light trap, 1800–2115 hours, W. E. Poole). Allotype from Noondoo, Queensland (16.xii.1963, light trap, A. L. Dyce), paratypes from Yelarbon (5 ♂♂, same data as holotype), Noondoo (1 ♂, 29–30.iii.1952, suction light trap, 2145–0130 hours, bored spring, W. E. Poole), Moree, New South Wales (1 ♀, date unknown, A. L. Dyce) and Mungie Bundie, Meehi R., Moree, New South Wales (1 ♂, 16.ii.1952, suction light trap, 2000–2130 hours, A. L. Dyce).

A medium-sized species, the male resembling *appendiculata* n. sp. in coloration and form of genitalia, the female with a distinctive wing pattern which readily differentiates it from other known species. The head is missing in the allotype.

Male: Length 1·91 mm., wing 1·01 × 0·39 mm.

Head brown. Eyes bare, broadly contiguous. Palp whitish, segment III with a small preapical sensory pore bearing a few sensillae (Fig. 121). Antennal segment II dark brown, III–XII brown, XIII–XV dark brown (Fig. 122); plume dark brown.

Scutum brown, darker dorsally, humeral areas pale, dark punctations at setal bases, these especially conspicuous in the humeral areas, scutellum light brown with a broad dark band either side of centre, with 4 setae, postscutellum dark brown, pleuron brown. Coxae and trochanters brown, the hind pair darker; legs whitish, extensively banded with brown, the fore femur broadly



Figs 121–131. *Alluaudomyia varia*. 121, ♂ maxillary palp, ×350; 122, ♂ antennal segments XI–XV, ×350; 123, ♀ wing, ×90; 124, ♂ wing, ×90; 125, ♀ femora and tibiae, ×90; 126, ♂ femora and tibiae, ×90; 127, ♀ fore (*upper*) and hind (*lower*) tarsus V and claw, ×350; 128. ♀ genital sclerotization, ×350; 129 ♀ spermathecae, ×350; 130, ♂ hypopygium, ×350; 131. ♂ paramere, ×350.

pale basally, with a wide brown central band, a pale preapical band and a brown apex, mid femur brown on basal half and at apex, hind femur with basal two-thirds and apex brown, fore tibia largely brown with narrow, pale sub-basal and apical bands, mid tibia similar but sub-basal pale band broader, hind tibia with base and apex brown and a brown central band (Fig. 126), hind tibial comb of 6 spines ; tarsi pale fuscous, the distal segments slightly darker, apex of fore segment I, base and apex of mid segment I, and all of hind segment I, brown. Claws of all legs small, simple, equal, half the length of the fifth tarsal segment.

Wing (Fig. 124) with three brown spots, one proximal to r-m cross-vein, one on R_1, and one at junction of costa and R_{4+5}, as well as a pale brown cloud anteriorly in cell R_5 beyond the end of the costa, veins slightly brownish. A small number of macrotrichia present on the anterior edge and apex of the wing, with a single row extending along the wing margin from M_2 to Cu_1, and a few on the lower ends of M_1, M_2 and M_{3+4}. Haltere yellowish, apex of knob brown.

Abdominal tergites whitish, each with a large, pale brown, M-shaped spot, sternites pale, pleural membranes pale fuscous. Hypopygium (Figs 130–131) dark brown, coxites long and slightly tapered, styles whitish, short, apices rounded and finger-like ; aedeagus with a squared basal arch surmounted by a pair of membranous lobes, and with a trifid caudal stem arising dorsal to the lobes, parameres separate, with a detached basal arm, stems broad basally, tapering gradually, the apex produced into a long, curving, pointed process, on the inner surface of which is a small, triangular flap from which arises a pale, short, tapered, setose process.

Female : Length (without head) 1·75 mm., wing 1·14 × 0·53 mm.

Generally similar to male, but differing as follows :

Hind tibial comb of 8 spines. Claws of fore and mid legs unequal, those of hind legs very unequal, ratio of length of claws to fifth tarsal segment 20 : 9 : 24 in fore, 22 : 10 : 22 in mid, 18 : 4 : 21 in hind (Fig. 127).

Wing (Fig. 123) with three radial spots and pale cloud anteriorly in cell R_5 as in male, but also with large spots around the wing margin, one each at the apices of cells R_5, M_1, M_2 and M_4, and one large and several smaller along the margin of the anal cell, as well as a spot over the basal third of M_2. Macrotrichia more extensive than in male, covering most of apical half of wing.

Abdomen as in male, but distal tergites entirely brown. Cerci white. Spermathecae two, oval, equal (Fig. 129).

Additional specimen : Queensland : Cunnamulla, Warrego River (1 ♂, 28.ii.1963, A. L. Dyce and M. D. Murray).

Distribution : Southern Queensland, northern New South Wales.

The association of the sexes in this species is based on the close resemblances in coloration and leg banding, and the presence in both sexes of the pale brown cloud anteriorly in wing cell R_5 beyond the costa. However, a much larger series of specimens is needed before the association can be regarded as definite.

15. Alluaudomyia platipyga Tokunaga

Alluaudomyia platipyga Tokunaga, 1963, *Pacif. Insects*, *5* : 221 (♂ only). (Type locality : Maprik, Sepik District, New Guinea.)

Characteristics : A small, dark brown species. Head brown, mouth parts white, eyes bare. Thorax mainly brown, lateral margins of scutum yellow, scutellum yellow with a dark median spot, 2 setae ; femora largely brown with bases ochreous and a white preapical band (very narrow in mid femur), tibiae largely white, bases and apices dark, fore tibia with a median dark band, mid and hind tibiae with a narrow dark band just before centre. Wing with three spots, one before r-m cross-vein and one on R_1 pale, one at junction of costa and

R_{4+5} prominent, a few macrotrichia apically in cell R_5. Haltere white. Abdomen almost white, with very pale fuscous clouds on tergites I–IV. Hypopygium complex, aedeagus twice as broad as long, subsquare, with lateral caudal angles hooked, parameres broadly fused, each with apical part flattened, angulated and irregularly barbed.

Distribution: Known only from the type locality.

The structure of the hypopygium is unique.

16. Alluaudomyia reyei n. sp. (Figs 132–133, 149–154, 165–169)

Types: Holotype ♂, allotype ♀, and 15 ♂♂ and 45 ♀♀ paratypes.

Type Locality: Darwin, Northern Territory (holotype and allotype 26–27.vii.1958, Quarantine Stn., suction light trap, E. J. Reye, paratypes 1♂, 4 ♀♀, 27–28.vi.1956, 1 ♀, 1–2.xi.1957, 1 ♀, 2–3.xi.1957, 3 ♀♀, 15–16.xi.1957, 4 ♂♂, 4 ♀♀, 22–23.xi.1957, 1 ♀, 22–23.v.1958, 1 ♂, 1 ♀, 28–29.v.1958, 1 ♀, 30–31.v.1958, 1 ♂, 4 ♀♀, 10–11.vi.1958, 2 ♀♀, 11–12.vi.1958, 2 ♀♀, 13–14.vi.1958, 1 ♀, 17–18.vi.1958, 1 ♂, 4 ♀♀, 18–19.vi.1958, 1 ♀, 28–29.vi.1958, 1 ♀, 6–7.vii.1958, 2 ♀♀, 9–10.vii.1958, 1 ♂, 2 ♀♀, 12–13.vii.1958, 4 ♂♂, 6 ♀♀, same date as holotype, all Quarantine Stn., light trap, E. J. Reye; 1 ♂, 1 ♀, 25–26.xi.1957, R.A.A.F. Marine Sect., E. J. Reye; 2 ♀♀, 26–27.xi.1957, East Arm Convent, N.J. light trap, E. J. Reye; 1 ♂, 28–29.xii.1957, N.J. light trap, J. Dyer; 1 ♀, 19–20.i.1958, R.A.A.F., N.J. light trap, J. Dyer).

A medium-sized brown and yellow species, the wing with spots on the anterior veins only.

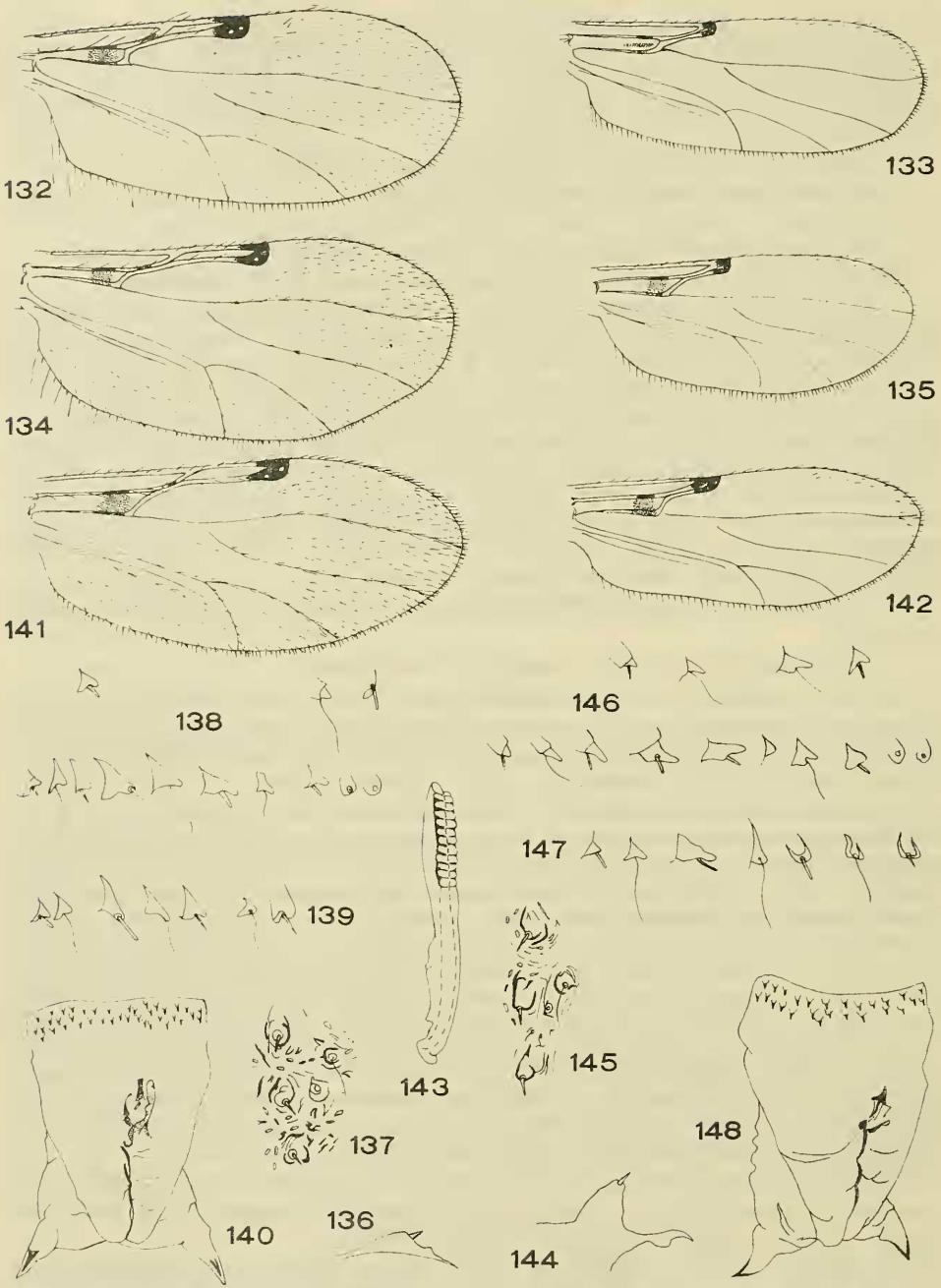
Male: Length 1·56 mm., wing 0·87 × 0·32 mm.

Head yellowish, vertex brown, clypeus light brown, proboscis yellow. Eyes bare, just contiguous. Palp whitish, segment V pale brown, segment III with a shallow preapical pit bearing a few sensillae. Antennal segment II dark brown, flagellum light brown (Fig. 167); plume brown.

Scutum ochreous with dark brown markings, the humeral areas white, scutellum fuscous on anterior half, whitish on posterior half, with 2 setae, postscutellum brown centrally, yellowish laterally, pleuron yellowish-ochreous, with fuscous clouds. Coxae and trochanters pale fuscous, hind pair more yellowish; femora and tibiae whitish, with brown markings, the fore femur with a broad brown central band and a brown apex, the mid femur with a broad, very pale brown sub-basal band, an equally pale brown preapical ring and a brown apex (Fig. 169), the hind femur with a broad brown postcentral band and a brown apex, the fore tibia with a brown base and apex and a broad central brown band, the mid tibia with a brown base and apex and very pale, narrow brown bands on the basal and apical thirds (Fig. 169), hind tibia very slightly fuscous basally, and with a brown central band and apex, hind tibial comb of 6 spines; tarsi whitish except hind segment I, which is brown. Claws of all legs small, equal and simple, just over half the length of the fifth tarsal segment.

Wing (Fig. 133) with two brown spots, one before r-m cross-vein and one at junction of costa and R_{4+5}. Only a few macrotrichia present, these restricted to the anterior edge of the wing. Haltere white.

Abdomen whitish, tergites I–V with a distinct, light brown M-shaped spot covering most of the tergite, VI with this spot indistinct, remaining tergites light brown. Hypopygium (Figs 152–154) brown, coxites short, styles almost straight, whitish, nearly as long as the coxites; aedeagus consisting of a simple arch, shallowly excavated basally, from which arises dorsally a ventrally bent, hook-like caudal process, parameres with long, attached basal apodemes, stems slender, with a pair of processes arising apically, one about twice the length of the other.



Figs 132–133. *Alluaudomyia reyei*. 132, ♀ wing, ×55; 133, ♂ wing, ×55. Figs 134–140. *Alluaudomyia bicornis*. 134, ♀ wing, ×55; 135, ♂ wing, ×55; 136–140. pupa. 136, antero-median tubercle of operculum, lateral view, ×200; 137, dorsal tubercles of cephalothorax, ×200; 138, tubercles of 7th abdominal segment, ×200; 139, tubercles of 8th abdominal segment, ×200; 140, ♂ anal segment, ×200. Figs 141–148. *Alluaudomyia fragmentum*. 141, ♀ wing, ×55; 142, ♂ wing, ×55; 143–148, pupa. 143, ♂ respiratory trumpet (paratype), ×200; 144, antero-median tubercle of operculum, lateral view (paratype), ×200; 145, dorsal tubercles of cephalothorax (paratype), ×200; 146, tubercles of 7th abdominal segment, ×200; 147, tubercles of 8th abdominal segment, ×200; 148, ♂ anal segment, ×200.

Female: Length 1·71 mm., wing 1·04 × 0·47 mm.

Generally similar to male, differing as follows:

Approximately 11 mandibular teeth. Eyes more broadly contiguous. Antennal segments III–IX with bases slightly whitish (Fig. 166).

Coloration of thorax and legs more intense than in male, leg bands quite distinct, dark area of mid femur more extensive (Fig. 168); distal two tarsal segments slightly fuscous. Claws of all legs very unequal, ratio of length of claws to fifth tarsal segment 21 : 12 : 21 in fore, 21 : 11 : 20 in mid, 16 : 6 : 18 in hind (Fig. 149).

Wing (Fig. 132) with an extra spot, on R_1. Macrotrichia extensive, covering the apical half of the wing and extending into the anal cell.

Cerci white. Spermathecae two, subspherical, subequal, each with a short chitinized neck (Fig. 150). Genital sclerotization as figured (Fig. 151).

Additional specimens: Queensland: Mossman Gorge (1 ♂, 23.iv.1967, D. H. Colless); Innisfail (1 ♀, Eubenangee Swamp, 13.vi.1963, H. Standfast); Magnetic Island (1 ♂, Horseshoe Bay, 9.vii.1952, 1100 hours, net, freshwater swamp, E. J. Reye); Belgian Gardens, Townsville (1 ♂, 11.xi.1955, 8 ♂♂, 12 ♀♀, of which 2 ♂♂ and 6 ♀♀ pinned, 13.xi.1955, 2100–2359 hours, mangrove tree. 3 ♂♂, 5 ♀♀, of which 2 ♂♂ and 3 ♀♀ pinned, 14.xi.1955, 1 ♂, 3 ♀♀, of which 1 ♀ pinned, 17.xi.1955, 1920–2100 hours, flying fox bait, 13 ♂♂, 4 ♀♀, 18.xi.1955, 0001–0300 hours, flying fox bait, 2 ♂♂, 1 ♀, same date, 0300–0500 hours, flying fox bait, 5 ♂♂, 3 ♀♀, same date, 2100–2359 hours, flying fox bait, 6 ♂♂, 5 ♀♀, 20.xi.1955, 2200–0600 hours, mango tree near polluted swamp, 2 ♀♀, 23.xi.1955, mango tree, all specimens light trap, A. K. O'Gower); Gilruth (2 ♂♂, 1 ♀, 11.xii.1963, dusk-dawn, light trap in fowl yard, A. L. Dyce); Yelarbon (1 ♀, 27.iii.1953, 1800–2115 hours, 1 ♂, 27–28.iii.1953, 2115–0045 hours, suction light trap, W. E. Poole). Western Australia: The Kimberleys (1 ♂, S.W. of Bedford Downs, 10 m. S. of Lansdowne H.S., vii.1964, light trap, R. Plumb).

Distribution: Northern Western Australia, Northern Territory, Queensland.

The male of this species is readily distinguishable from the males of *bicornis* and *fragmentum* by the form of the genitalia, but the females of these three species are very difficult to differentiate. However, the form of the female genital sclerotization is sufficiently distinctive in each of the three species to be of use in identification. The association of male and female in *reyei* is based on the evidence of a large series from Townsville, the males of which can all be classed as *reyei*, and the females of which all have the type of genital sclerotization here regarded as characteristic of the female of *reyei*. The sub-basal brown band of the mid femur also tends to be more extensive in *reyei* than in *fragmentum* and *bicornis*, but this character is difficult to use with certainty.

17. Alluaudomyia bicornis n. sp. (Figs 134–140, 155–159, 170–173)

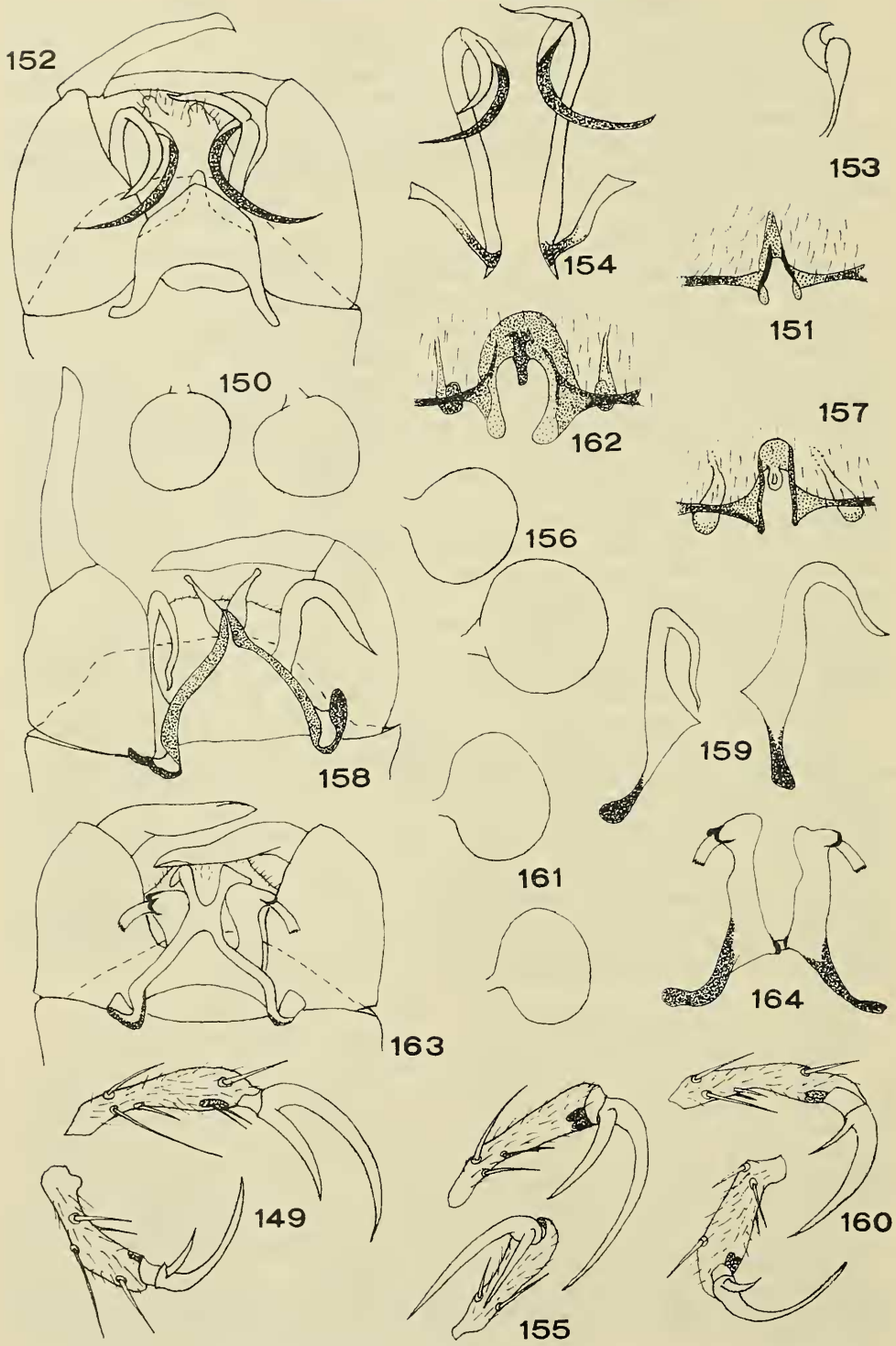
Types: Holotype ♂, allotype ♀, and 4 ♂♂ and 20 ♀♀ paratypes.

Type Locality: Darwin, Northern Territory ((holotype 17–18.vi.1958, N.J. light trap, allotype, 26–27.vii.1958, suction light trap, Quarantine Stn., E. J. Reye; paratypes, 1 ♀, 2–3.xi.1957, 1 ♀, 22–23.v.1958, 2 ♀♀, 27–28.v.1958, 1 ♀, 28–29.v.1958, 2 ♀♀, 10–11.vi.1958, 2 ♀♀, 13–14.vi.1958, 1 ♀, 14–15.vi.1958, 2 ♀♀, same date as holotype, 3 ♂♂, 4 ♀♀, 18–19.vi.1958, 1 ♂, 2 ♀♀, same date as allotype, Quarantine Stn., light trap, E. J. Reye; 1 ♀, 26–27.xi.1957, East Arm Convent, N.J. light trap, E. J. Reye; 1 ♀, 28.iv.1958, N.J. light trap, J. Dyer).

A small yellow and brown species with a two or three spotted wing.

Male: Length 1·27 mm., wing 0·81 × 0·30 mm.

Head brown. Eyes bare, just contiguous. Palp whitish, segment III with a preapical pit bearing sensillae (Fig. 170). Antennal segment II dark brown, segments III–XII whitish, segments XIII–XV brown (Fig. 172).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Scutum brown with darker brown markings, particularly around setal bases, humeral areas and lateral margins yellowish, scutellum brown on anterior half, pale on posterior half, with 2 setae, postscutellum dark brown, lighter laterally, pleuron brown, but yellowish immediately below scutum. Coxae and trochanters pale yellowish-brown ; femora and tibiae whitish, fore femur with a broad brown band just beyond centre and brown apex, mid femur with a pale brown, moderately broad central band, a narrow, incomplete preapical ring and a brown apex, hind femur with a moderately broad brown band just beyond centre and a brown apex, fore tibia with base, broad central area and apex brown, mid tibia with base and apex brown and a very pale fuscous preapical band, hind tibia with base and apex brown and a narrow, incomplete central band, hind tibial comb of 6 spines ; tarsi whitish, hind first tarsal segment pale fuscous. Claws of all legs small, equal and simple, about half the length of the fifth tarsal segment.

Wing (Fig. 135) with two brown spots, one before r-m cross-vein and one at junction of costa and R_{4+5}. Macrotrichia very sparse, restricted to the anterior margin of the wing apex. Haltere white.

Abdomen pale brown, becoming slightly darker distally. Hypopygium (Figs 158–159) dark brown, styles white, slightly sinuous ; aedeagus with basal arch very shallow, scarcely excavated, apex bifid, forming a pair of horn-like processes, parameres with triangular bases, stems tapering, apices drawn out into long, tapered processes.

Female : Length 1·29 mm., wing 1·06 × 0·46 mm.

Generally similar to male, differing as follows :

Approximately 10 mandibular teeth. Antennal segments IV–VIII with bases whitish (Fig. 171).

Scutum more yellowish than in male, brown markings more distinct, humeral areas whitish. Leg banding more distinct, mid tibia with preapical band darker, also with a very pale fuscous sub-basal band, central band of hind tibia complete (Fig. 173), hind tibial comb of 7–8 spines. Claws of all legs very unequal, ratio of length of claws to fifth tarsal segment 23 : 12 : 22 in fore, 26 : 14 : 22 in mid, 20 : 10 : 18 in hind (Fig. 155).

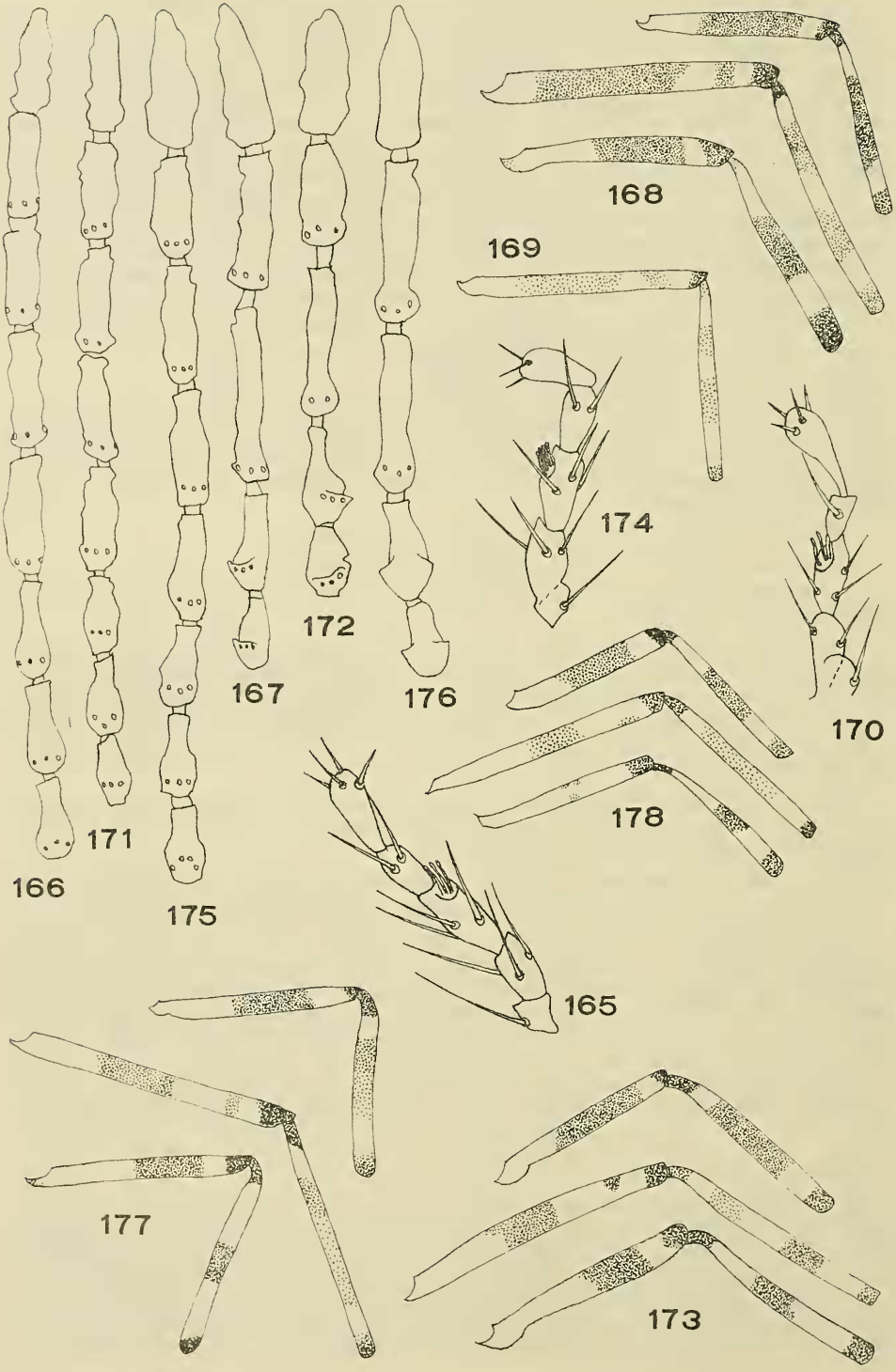
Wing (Fig. 134) with three brown spots, one before r-m cross-vein, one on R_1 and one at junction of costa and R_{4+5}. Macrotrichia dense, covering apical half of wing and extending into anal cell.

Cerci white. Spermathecae (Fig. 156) two, subspherical, subequal, each with a short, stout, chitinized neck. Genital sclerotization as figured (Fig. 157).

Pupa (Manton R. specimen) : Light brown, dorsum of thorax darker. Respiratory trumpet shrivelled, but similar to that of *fragmentum* n. sp., with 12 pairs of spiracles. Operculum with small a.m. tubercles bearing short spines (Fig. 136) rest not visible. Dorsal tubercles of cephalothorax as figured, 1, 2 and 3 with a short, stout spine, 4 with a long, fine seta, 5 with pore only, 4 and 5 more widely separated than in *fumosipennis* n. sp. (Fig. 137). Tubercles of abdominal segments 3–7 as figured, d.a.s.m. 2 and l.a.s.m. with stout, blunt spines, d.a.s.m. 1 with a long seta, d.p.m.'s 4 and 5 with pore only, 3 with a stout spine.

Explanation of Text figs. 149-164

Figs 149–154. *Alluaudomyia reyei.* 149, ♀ fore (*upper*) and hind (*lower*) tarsus V and claw, × 350 ; 150, ♀ spermathecae, × 350 ; 151, ♀ genital sclerotization, × 350 ; 152, ♂ hypopygium, × 350 ; 153, lateral view of aedeagal arch (Townsville specimen), × 350 ; 154, ♂ parameres, × 350. Figs 155–159. *Alluaudomyia bicornis.* 155, ♀ fore (*upper*) and hind (*lower*) tarsus V and claw, × 350 ; 156, ♀ spermathecae, × 350 ; 157, ♀ genital sclerotization, × 350 ; 158, ♂ hypopygium (Mossman Gorge specimen), × 350 ; 159, ♂ parameres (Mossman Gorge specimen), × 350. Figs 160–164. *Alluaudomyia fragmentum.* 160, ♀ fore (*upper*) and hind (*lower*) tarsus V and claw, × 350 ; 161, ♀ spermathecae, × 350 ; 162, ♀ genital sclerotization, × 350 ; 163, ♂ hypopygium, × 350 ; 164. ♂ parameres, × 350.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2 with a long seta, 1 absent, l.p.m.'s 1 and 3 with a stout spine, 2 with a long seta, v.p.m.'s 1 and 3 with a spine, 2 with a seta (Fig. 138). Tubercles of abdominal segment 8 as figured, d.a.s.m.'s, l.a.s.m., d.p.m.'s 1 and 4–5, and v.p.m. 1 absent, remaining tubercles similar to those on preceding segment (Fig. 139). Anal segment with a narrow basal band of 2–3 rows of spines (Fig. 140).

Additional specimens: Northern Territory: Manton R. (1 ♂, 6.vi.1958, bred ex pupa from reservoir, E. J. Reye). Queensland: Mossman Gorge (1 ♂, 23.iv.1967, D. H. Colless); Gilruth (2 ♂♂, 15.xii.1963, light trap, A. L. Dyce); Yelarbon (2 ♀♀, 27.iii.1953, 1800–2115 hours, 7 ♀♀, 27–28.iii.1953, 2115–0045 hours, suction light trap, W. E. Poole); Noondoo (1 ♀, 29.iii.1953, 2145–0130 hours, suction light trap, W. E. Poole; 1 ♀, 26.ii.1963, light trap, A. L. Dyce and M. D. Murray; 1 ♀, 16.xii.1963, light trap, A. L. Dyce); Texas Station (2 ♀♀, 26.iii.1953, dusk–2110 hours and dusk–2130 hours, suction light trap, A. L. Dyce). New South Wales: Mungie Bundie, Meehi River, Moree (2 ♀♀, 16.ii.1952, 2000–2130 hours, suction light trap, A. L. Dyce); Yagobie (1 ♀, 3.xi.1951, 1920–2100 hours, suction light trap, A. L. Dyce).

Distribution: Northern Territory, Queensland, northern New South Wales.

The male genitalia of this species are quite distinctive, but females are apparently distinguishable from females of *reyei* n. sp. and *fragmentum* n. sp. only by the form of the genital sclerotization. The single pupa available can be distinguished from the pupa of *fragmentum* by the smaller anteromarginal tubercles on the operculum, the absence of the first dorsal posteromarginal tubercle on abdominal segments 3–7, and the lack of anterior displacement of the second lateral posteromarginal abdominal tubercle.

18. Alluaudomyia fragmentum n. sp. (Figs 141–148, 160–164, 174–178)

Types: Holotype ♂, allotype ♀, and 1 ♂ and 1 ♀ paratypes.

Type Locality: Manton River, Northern Territory (holotype, 6.vi.1958, bred from pupa, E. J. Reye; allotype 15.vi.1958, ex reservoir, E. J. Reye; paratype ♂ 1.vi.1958, bred from pupa ex reservoir, E. J. Reye; paratype ♀ same data as holotype, ex reservoir).

A medium-sized yellow and brown species with a pale abdomen and two or three spotted wing.

Male: Length 1·89 mm., wing 0·84 × 0·33 mm.

Head brown. Eyes bare, just contiguous. Palp whitish, segments IV and V pale brown, segment III with a preapical pit bearing sensillae (Fig. 174). Antennal segment II dark brown, flagellum brown (Fig. 176); plume dark brown.

Scutum brown with darker brown markings, particularly around setal bases, humeral areas and lateral margins yellowish, scutellum brown on anterior half, pale brown posteriorly, with 2 setae, postscutellum dark brown, paler laterally, pleuron brown except for a transverse yellow band just below the scutum. Coxae and trochanters pale brown; femora and tibiae whitish, fore femur with central third and apex brown, mid tibia with a broad central brown band, a pale brown preapical band and a brown apex, hind femur with an almost obsolete pale brown central band and a brown apex, fore tibia with base, apex and broad

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Explanation of Text figs. 165-178

Figs 165–169. *Alluaudomyia reyei.* 165, ♀ maxillary palp, × 350; 166, ♀ antennal segments VIII–XV, × 350; 167, ♂ antennal segments XI–XV (paratype), × 350; 168, ♀ femora and tibiae, × 90; 169, ♂ mid femur and tibia, × 90. Figs 170–173. *Alluaudomyia bicornis.* 170, ♂ maxillary palp, × 350; 171, ♀ antennal segments VIII–XV, × 350; 172, ♂ antennal segments XI–XV, × 350; 173, ♀ femora and tibiae, × 90. Figs 174–178. *Alluaudomyia fragmentum.* 174, ♂ maxillary palp, × 350; 175, ♀ antennal segments VIII–XV, × 350; 176, ♂ antennal segments XI–XV, × 350; 177, ♀ femora and tibiae, × 90; 178 ♂ femora and tibiae, × 90.

central area brown, mid tibia with base and apex brown, rest very pale fuscous except for a whitish sub-basal and preapical band, hind tibia with base, apex and narrow central band brown (Fig. 178), hind tibial comb of 6 spines ; tarsi whitish except hind tarsal segment I light brown. Claws of all legs small, equal and simple, half to two-thirds the length of the fifth tarsal segment.

Wing (Fig. 142) with two brown spots, one just before r-m cross-vein, the other covering R_1 and the apical ends of the costa and R_{4+5}. Macrotrichia very sparse, restricted to the anterior margin of the apical third of the wing. Haltere whitish.

Abdomen very pale, almost white, with light brown markings on tergites. Hypopygium (Figs 163–164) dark brown, but coxites paler on apical half, styles sinuous, rather stout ; aedeagus with a very shallow arch, the apex extended into two laterally bent processes, parameres with stout stems, each with a short, flat apical process which terminates abruptly in a serrated edge, as though broken.

Female : Length 1·78 mm., wing 1·06 × 0·45 mm.

Generally similar to male, differing as follows :

Approximately 12 mandibular teeth. Segments IV–VIII of antennae with bases whitish (Fig. 175).

Leg banding slightly more distinct, central band on hind femur not almost obsolete (Fig. 177), hind tibial comb of 6–7 spines. Claws of all legs very unequal, ratio of length of claws to fifth tarsal segment 18 : 7 : 21 in fore, 19 : 8 : 20 in mid, 16 : 6 : 19 in hind (Fig. 160).

Wing (Fig. 141) with three brown spots, one before r-m cross-vein, one on R_1 and one at junction of costa and R_{4+5}, radial cell considerably longer than in male. Macrotrichia dense, covering apical half of wing and extending into anal cell.

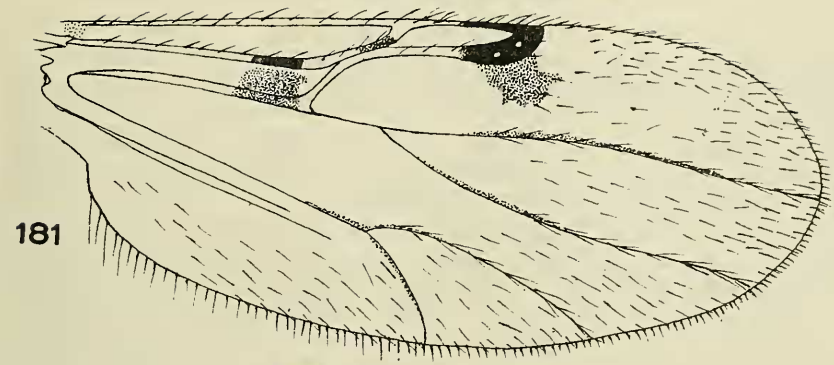
Cerci white. Spermathecae two, oval, subequal, each with a short, thick, chitinized neck (Fig. 161). Genital sclerotization extensive, as figured (Fig. 162).

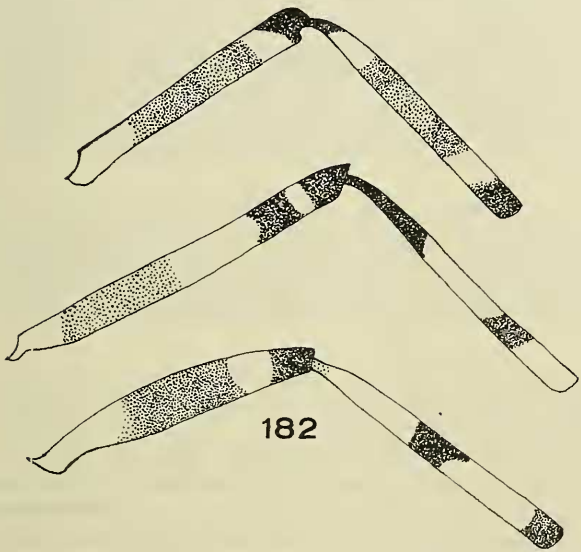
Pupa : Light brown, dorsum of thorax darker. Respiratory trumpet dark brown, with 11–12 pairs of spiracles on apical third (Fig. 143). Median tubercle of operculum without spine, situated well back from distal edge, a.m. tubercles large, each with a short, stout spine (Fig. 144), rest of surface with small tubercles. Dorsal tubercles of cephalothorax as figured, 1, 2 and 3 with a short, stout spine, 4 with a long, fine seta, 5 with pore only (Fig. 145). Tubercles of abdominal segments 3–7 as figured, d.a.s.m. 2 and l.a.s.m. with a short, stout spine, d.a.s.m. 1 with a long seta, d.p.m.'s 1, 4 and 5 with pore only, 2 with a long seta and 3 with a stout spine, l.p.m.'s 1 and 3 with a stout spine, 2 displaced anteriorly so it is in line with the anterosubmarginal tubercles, with a long seta, v.p.m.'s 1 and 3 with a stout spine, 2 with a long seta (Fig. 146). Tubercles of abdominal segment 8 as figured, d.a.s.m.'s, l.a.s.m., d.p.m.'s 1, 4 and 5 and v.p.m. 1 absent, remaining tubercles similar to those on preceding segment (Fig. 147). Anal segment with a basal band of 2–3 rows of small spines (Fig. 148).

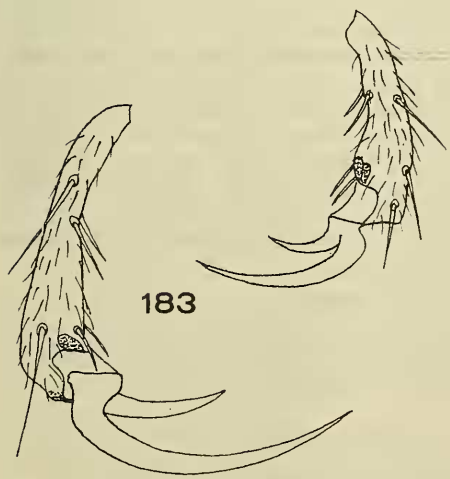
Additional specimen : Northern Territory : Darwin (1 ♀, 22–23.v.1958, Quarantine Stn., N.J. light trap, E. J. Reye).

Distribution : Northern Territory.

The male of this species can be readily identified by the form of the genitalia. The female is apparently only distinguishable from females of *reyei* n. sp. and *bicornis* n. sp. by the extensive genital sclerotization. The sexes are associated on the basis of pupal characters, particularly the anterior displacement of the second lateral posteromarginal tubercle on abdominal segments 3–7.







Figs 179–184. *Alluaudomyia petersi* (Lae specimen). 179, ♀ maxillary palp, ×350; 180, ♀ antennal segments XIII–XV ×350; 181, ♀ wing, ×90; 182, ♀ femora and tibiae, ×90; 183, ♀ fore (*left*) and hind (*right*) tarsus V and claw, ×350; 184, ♀ spermathecae, ×350.

19. Alluaudomyia petersi Tokunaga. (Figs 179–184)

Alluaudomyia petersi Tokunaga, 1963, *Pacif. Insects*, *5*: 228 (♀ only). (Type locality: Maprik, Sepik District, New Guinea; paratype from Bainyik, New Guinea.)

Specimens examined: New Guinea: Damanti Village, Finisterre Range, Madang Central Subdistrict (1 ♀, x.1964, 3,500 ft., R. Pullen); Lae (1 ♀, vii.1958, light trap, W. Peters). Holotype also examined.

Characteristics: A medium-sized brown and yellow species. Male unknown. Head ochreous, eyes bare. Thorax yellow, extensively mottled with brown, scutellum yellow with a median fuscous spot, 4 setae, postscutellum fuscous with two yellowish anterior spots; legs yellow, banding as figured (Fig. 182), female claws (Fig. 183) unequal, ratio of length of claws to fifth tarsal segment 28·8 : 14·8 : 28 in fore, 29·8 : 14·3 : 27·5 in mid, 19·3 : 8 : 22 in hind. Wing with three spots, one before r-m cross-vein, one on R_1 and one at junction of costa and R_{4+5}, the latter spot extending into cell R_5 (Fig. 181), macrotrichia numerous on apical half of wing and in anal cell. Haltere white. Abdominal tergites mainly brown, but I widely yellow, II–VIII yellow on distal margin, IX and caudal end white, cerci white. Spermathecae (Fig. 184) two, round, subequal, one with a short process, the other with a slightly longer process.

Distribution: New Guinea.

Tokunaga states that the macrotrichia on the wing of this species are "rather sparsely spread on apical part beyond level of costal end", and his diagram shows this arrangement, but a check of the holotype reveals that the macrotrichia are rather more extensive, agreeing with the present specimens. The broadly dark basal end of the mid tibia readily identifies this species.

20. Alluaudomyia astera Tokunaga

Alluaudomyia astera Tokunaga, 1963, *Pacif. Insects*, *5*: 222 (♂ only). (Type locality: Inis Atoll, Bougainville I., Solomon Is.)

Characteristics: A small yellow and brown species. Female unknown. Head ochreous, eyes bare. Thorax with tergites mainly yellow, pleurites and sternites fuscous, scutum with a median star or crux-shaped dark spot and several fuscous clouds and spots, scutellum yellow with a dark median spot, 4 setae, postscutellum dark centrally, yellow laterally; legs yellow with brown bands, fore femur with narrow pale base, median part fuscous, a narrow, indistinctly paler preapical ring and dark apex, tibia with base, apex and broad median part dark, mid femur entirely pale except for a dark preapical ring and dark apex, tibia with base and apex dark and a dark sub-basal and preapical band, hind femur widely dark medially and with a dark apex, tibia with a narrow central dark band and dark apex. Wing with three spots, as in *petersi* Tokunaga, macrotrichia sparsely spread on wing margin between ends of costa and M_2. Haltere white. Abdomen yellowish ochreous, tergites I–VI with pale fuscous clouds, pleural membranes dark. Hypopygium yellow, coxites and tips of styles dark, aedeagus bell-shaped, short caudal stem bent ventrally, parameres broadened, flattened and oval on apical two-fifths.

Distribution: Known only from the type locality.

This species can be distinguished from *jimmensis* Tokunaga and *smeei* Tokunaga, which have similar leg banding, by the entirely pale basal two-thirds of the mid femur and by the more yellowish scutum.

21. Alluaudomyia jimmensis Tokunaga. (Figs 185–195)

Alluaudomyia jimmensis Tokunaga, 1963, *Pacif. Insects*, *5*: 229. (Type locality: Tsenga, Jimmi Valley, N.E. New Guinea; allotype from Enarotadi, Wisselmeren, West Irian, paratype from Kainantu, N.E. New Guinea.)

Specimens examined: New Guinea: Lumi (1 ♂, v.1969, 2,000 ft., Dr. L. Wark); Maprik (2 ♂♂, 1 ♀, 1958).

Characteristics: A medium-sized brown and yellow species. Head brown, frons yellow, eyes bare. Thorax yellow with extensive light and dark brown markings (Fig. 195), scutellum yellow with two fuscous spots and 4 setae, postscutellum brown with two anterior yellow spots; legs yellow, with banding as figured (Fig. 189), female claws (Fig. 190) unequal, ratio of length of claws to fifth tarsal segment 28 : 15 : 30 in fore, 30 : 12 : 30 in mid, 20 : ? : 24·5 in hind (20 : 8·4 : 24 in Maprik specimen), male claws all small and equal. Wing with three spots, one before r-m cross-vein, one on R_1, and one at the junction of the costa and R_{4+5}, the latter spot extending on to the membrane (Fig. 188), female with a moderate number of macrotrichia on the apical third of the wing, male with only a few macrotrichia on the wing margin. Haltere white. Abdomen pale, in female tergite I with a small fuscous cloud, II–VI with M-shaped fuscous fuscous markings, VII–VIII fuscous, XI and cerci white, in male tergite I fuscous laterally, II–III with M-shaped spot, IV–V widely dark, VI–VII fuscous laterally, VIII entirely fuscous, hypopygium brown. Spermathecae (Fig. 191) two, equal, round, one with a short, straight diverticulum, the other with a long and undulate process. Aedeagus triangular, apex bent ventrally, parameres separate, each with a detached basal arm, stem slightly swollen medially, apex flattened and pointed, slightly bent laterally (Figs 192–194).

Distribution: New Guinea.

This species is very similar to *smeei* Tokunaga, but the females are readily distinguished by the spermathecal diverticula, the longer one in *jimmensis* being undulate and about 0·05 mm. long, while in *smeei* it is straight and under 0·04 mm. long. The male of *smeei* is unknown.

22. Alluaudomyia smeei Tokunaga. (Figs 196–197)

Alluaudomyia smeei Tokunaga, 1963, *Pacif. Insects*, *5*: 230 (♀ only). (Type locality: Lowlands Agr. Stat., Keravat, New Britain.)

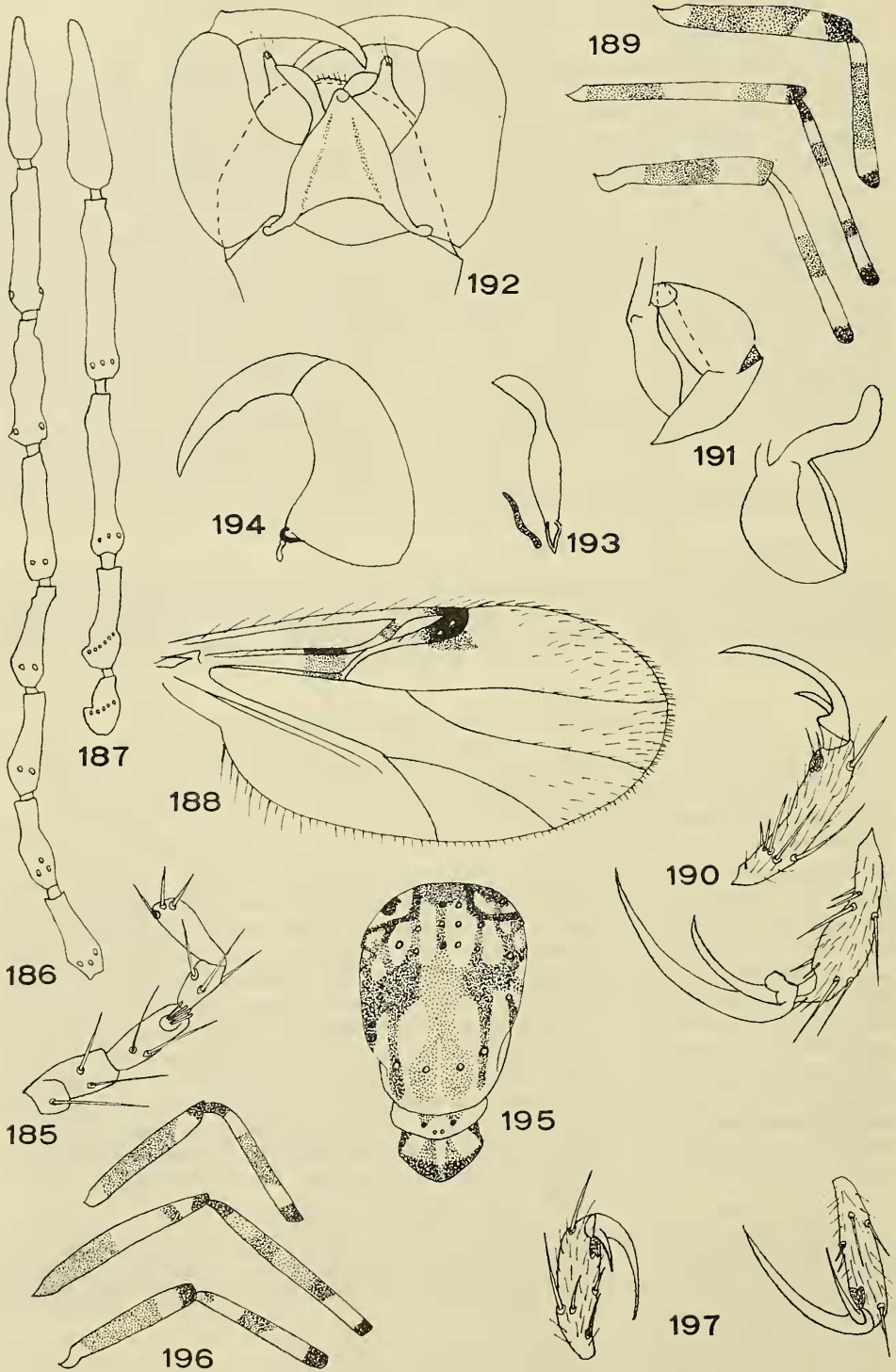
Specimen examined: New Guinea: Maprik (1 ♀, iv.1958). Holotype also examined.

Characteristics: A small yellow and brown mottled species. Head brown, eyes bare. Thorax yellow and brown, scutum yellow with an extensive brown pattern very similar to that in *jimmensis*, scutellum brown centrally, yellow laterally, with 4 setae, postscutellum brown with two anterior yellow spots; legs yellow, banded brown as figured (Fig. 196), female claws (Fig. 197) all unequal, ratio of length of claws to fifth tarsal segment 20 : 12 : 19 in fore, 20 : 12* : 17 in mid, 14 : 6 : 16 in hind. Wing with two spots, one before r-m cross-vein and one at junction of costa and R_{4+5}, the latter spot extending very slightly into cell R_5, macrotrichia sparse, restricted almost entirely to wing margin between the ends of the costa and M_{3+4}. Haltere white. Abdominal tergites white with large M-shaped brown spots similar to *jimmensis*. Spermathecae round, slightly unequal, in the type diverticulum of larger spermatheca approximately twice the length of the diverticulum of the smaller.

Distribution: New Britain, northern New Guinea.

The specimen from Maprik differs in having the longer spermathecal diverticulum only one and a third times the length of the shorter diverticulum. However, it appears identical to *smeei* in other characters, and so at present is included in this species.

* Not 19 as in original description (remeasured on holotype).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23. Alluaudomyia spinosipes Tokunaga. (Figs 198–207)

Alluaudomyia spinosipes Tokunaga, 1962, *Pacif. Insects*, *4*: 206. (Type locality: Chibana, Okinawa; paratypes from Sonabi and Yaka, Okinawa); Wirth and Delfinado, 1964, *Pacif. Insects*, *6*: 615 (Ceylon, Indonesia, Laos, Malaya, North Borneo, Philippines, Sarawak, Thailand, Viet Nam).

Alluaudomyia novaguineae (also as *novaguineana*) Tokunaga, 1963, *Pacif. Insects*, *5*: 227. (Type locality: Minj, W. Highlands, New Guinea; paratype from Maprik, New Guinea.) *New synonymy.*

Specimens examined: New Guinea: Maprik (3 ♂♂, 7 ♀♀, 1958; 1 ♀, iv.1958; 1 ♂, vii.1958). Holotype and allotype of *A. novaguineae* and 1 ♂, 11 ♀♀, from Wirth and Delfinado's specimens of *A. spinosipes* also examined.

Wirth and Delfinado state that *novaguineae* (*novaguineana*) differs from *spinosipes* in having the female claws all unequal. An examination of the allotype female of *novaguineae* shows that the claws are, in fact, as described for *spinosipes*, i.e. fore and mid claws subequal, hind unequal. Comparison of descriptions and specimens of *novaguineae* and *spinosipes* reveals no differences that could be regarded as of specific value, so *novaguineae* must be considered a synonym of *spinosipes*.

Characteristics: A medium-sized yellow and brown mottled species. Head brown, eyes bare. Scutum yellow, mottled extensively with dark brown, scutellum yellow with a central fuscous spot, 4 setae; legs yellow with brown bands as figured (Fig. 201), female with fore and mid claws subequal, hind claws very unequal (Fig. 202), ratio of length of claws to fifth tarsal segment 20 : 20 : 23 in fore and mid, 20 : 8 : 21 in hind, male claws all small and equal. Wing (Fig. 200) with two dark spots, one before r-m cross-vein and one at junction of costa and R_{4+5}, in female macrotrichia sparsely spread on anterior edge and apical fourth of wing, in male macrotrichia restricted to apical margin of cells R_5 and M_1. Haltere of male white, of female yellow with knob brown. Abdomen yellow and brown, tergite I yellow, sometimes with pale brown median spot, II–III yellow with brown T-shaped spot on proximal three-fourths, IV and V similar to III or entirely brown, VI similar to III, entirely brown, or yellow, VII yellow, VIII brown or yellow, IX brown or white (Fig. 203), female cerci white, male hypopygium brown. Spermathecae two, equal, subspherical, each with a short, clavate diverticulum (Fig. 204). Aedeagus bell-shaped, apex bent ventrally, parameres separate, stems very slender on basal half, broader on apical half, apices sharply bent laterally, triangular (Figs 205–207).

Distribution: Ceylon, Thailand, Laos, Viet Nam, Ryukyu Islands, Indonesia, Malaya, Sarawak, North Borneo, Philippines, New Guinea.

The subequal claws on the fore and mid legs of the female, the clavate diverticula of the spermathecae and the form of the male genitalia distinguish this species.

24. Alluaudomyia sp. N.G. No. 1

Alluaudomyia sp. N.G. No. 1 Tokunaga, 1963, *Pacif. Insects*, *5*: 226 (♀ only). (Locality: Aiyurop, 1,530 m., nr. Mendi, S. Highlands, New Guinea.)

The leg banding and structures of the spermathecae of the single specimen reported by Tokunaga suggest that it could belong to an as yet undescribed

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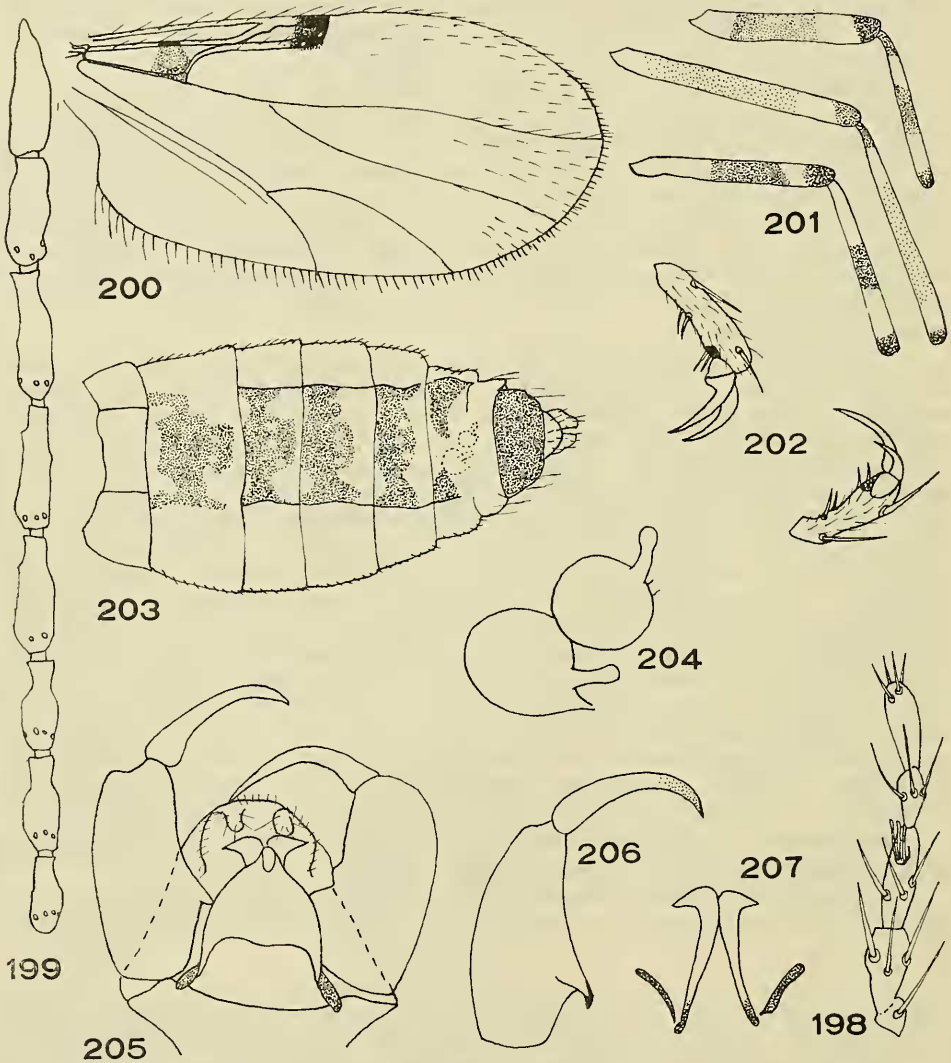
Explanation of Text-figs. 185-197.

Figs 185–195. *Alluaudomyia jimmensis* (Maprik specimen). 185, ♀ maxillary palp, ×350; 186, ♀ antennal segments VIII–XV, ×350; 187, ♂ antennal segments XI–XV, ×350; 188, ♀ wing, ×90; 189, ♂ femora and tibiae, ×90; 190, ♀ fore (*lower*) and hind (*upper*) tarsus V and claw, ×350; 191, ♀ spermathecae, ×350; 192, ♂ hypopygium, ×350; 193, ♂ paramere, ×350; 194, ♂ coxite and style, ×350; 195, dorsum of thorax (Lumi specimen). Figs 196–197. *Alluaudomyia smeei*. 196, ♀ femora and tibiae, ×90; 197, ♀ fore (*right*) and hind (*left*) tarsus V and claw, ×350.

species, but as both wings were broken off the specimen an adequate description cannot be made, and the species remains unnamed.

Characteristics: A medium-sized brown species. Head brown, eyes bare. Thorax largely brown, scutum with indistinct paler spots, scutellum yellow, 4 setae ; legs with all coxae, trochanters, knee parts and tibial apices dark, fore



Figs 198–207. *Alluaudomyia spinosipes* (Maprik specimen). 198, ♀ maxillary palp, ×350 ; 199, ♀ antennal segments VIII-XV, ×350 ; 200, ♀ wing, ×90 ; 201, ♀ femora and tibiae, ×90 ; 202, ♀ fore (*left*) and hind (*right*) tarsus V and claws, ×350 ; 203, ♀ abdomen, ×90 ; 204, ♀ spermathecae, ×350 ; 205, ♂ hypopygium, ×350 ; 206, ♂ coxite and style, ×350 ; 207, ♂ parameres, ×350.

and hind femora fuscous on basal two-thirds, white preapically, mid femur fuscous on basal half, white on preapical half, tibiae largely white but fore femur with a fuscous median cloud, mid with a fuscous preapical cloud and hind with a prominent, oblique, fuscous sub-basal band, claws all unequal, ratio of lengths

of claws to fifth tarsal segment 31 : 22 : 26 in fore, 33 : 18 : 25 in mid, 21 : 11 : 20 in hind. Wing with a spot before r-m cross-vein, rest of wings broken off. Abdomen very pale ochreous, almost white, cerci white. Spermathecae round, subequal but with very unequal diverticula.

Distribution : Known only from the locality recorded by Tokunaga.

25. Alluaudomyia brandti Tokunaga. (Figs 208–212)

Alluaudomyia brandti Tokunaga, 1963, *Pacif. Insects*, *5* : 223 (♀ only). (Type locality : Kulumadau Hill, Woodlark (Murua) I., New Guinea.)

Specimens examined : Northern Territory : Darwin (1 ♂, 1–2.vi.1957, 1 ♀, 27–28.v.1958, 1 ♀, 15–16.vi.1958, 1 ♀, 12–13.vii.1958, Quarantine Stn., N.J. light trap, E. J. Reye). Holotype also examined.

The Darwin specimens are very similar to the holotype except for the presence of dark dots at some of the thoracic setal bases (in the holotype only one or two extremely pale dots are present). However, because thoracic coloration is often variable within this genus, these specimens are at present regarded as *brandti*.

Female : Head dark brown, eyes bare. Scutum yellow, anterior margin fuscous, humeral pits dark, W-shaped dark stripe around posterior margins of humeral areas, fuscous rhombic median spot, small fuscous clouds posterior to scutal sutures and anterior to scutellum, which is yellow, with 4 setae, postscutellum brown centrally, yellow laterally ; legs yellow with brown bands as figured (Fig. 208), claws all very unequal (mid and hind claws missing in holotype) (Fig. 209). Wing with dark spots proximal to r-m and at junction of costa and R_{4+5} (also a faint spot on R_1 in the Darwin specimens), macrotrichia spread over apical half of wing. Haltere white. Abdomen yellow, tergites I–VI with pale brown T-shaped clouds on anterior part, VIII with a dark narrow median band. Spermathecae two, subequal, each with a small diverticulum.

Male : Length 1·59 mm., wing 0·84 × 0·30 mm.

Generally similar to female, differing as follows :

Antennal plume dark brown. Thorax light brown instead of yellow, but with similar dark markings except some setal bases with dark dots. Claws all small and equal, half the length of the fifth tarsal segment. Macrotrichia restricted to anterior edge of wing. Hypopygium (Figs 210–212) brown, styles with apical third brown, sharply bent. Aedeagus bell-shaped, apical point bent ventrally, parameres strongly swollen on basal half of stems, apices bent at right angles, scarcely tapered and rather blunt.

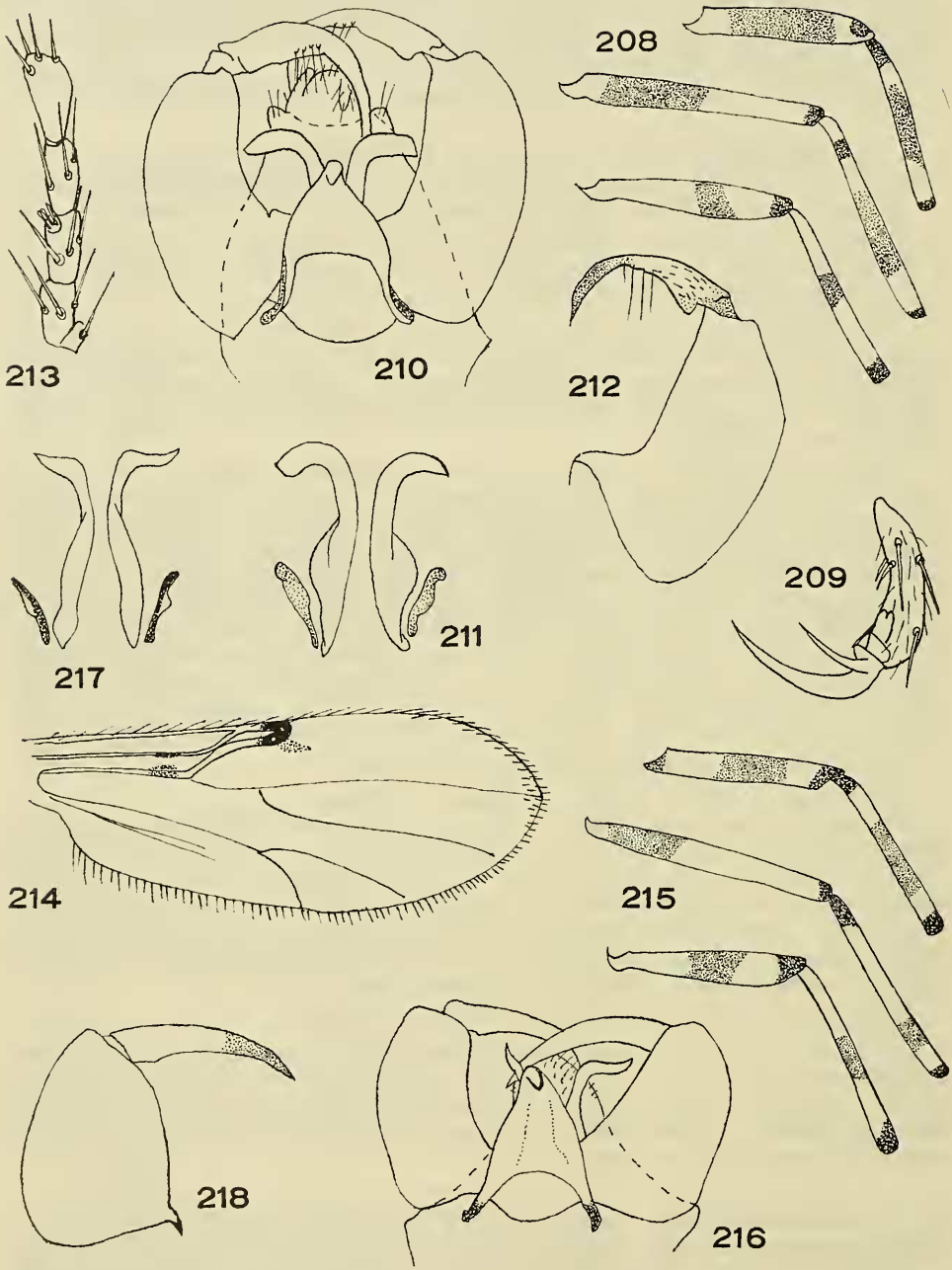
Distribution : Woodlark Island, Northern Territory.

Females of *brandti* are distinguished from those of *tenuistylata* by the shorter spermathecal diverticula. The males are distinguished most easily by the form of the parameres, in *brandti* the stems being swollen and the apices blunt and scarcely tapered, in *tenuistylata* the stems being slender and the apices more slender, tapering and undulate.

26. Alluaudomyia tenuistylata Tokunaga. (Figs 213–218)

Alluaudomyia tenuistylata Tokunaga, 1959, *Pacif. Insects*, *1* : 296 (♂ only). (Type locality : Hollandia [Kotabaru], West Irian) ; Tokunaga, 1963, *Pacif. Insects*, *5* : 225 (♂, ♀, Kamo Valley, Itouda, Wisselmeren, West Irian and Maprik, Sepik District, New Guinea.)

Specimens examined : New Guinea : Maprik (1 ♂, iv.1958, 2 ♂♂, 1958). Queensland : Innisfail (1 ♂, Eubenangee Swamp, 14.ix.1963, H. Standfast). Holotype also examined.



Figs 208–212. *Alluaudomyia brandti*. 208, ♀ femora and tibiae, ×90; 209, ♀ fore tarsus V and claw, ×350; 210, ♂ hypopygium (Darwin specimen), ×350; 211, ♂ parameres (Darwin specimen). ×350; 212, ♂ coxite and style (Darwin specimen), ×350. Figs 213–218. *Alluaudomyia tenuistylata* (Maprik specimen). 213, ♂ maxillary palp, ×350; 214, ♂ wing, ×90; 215, ♂ femora and tibiae, ×90; 216, ♂ hypopygium, ×350; 217, ♂ parameres, ×350; 218, ♂ coxite and style, ×350.

Characteristics: A small to medium-sized, largely yellow species. Head brown, eyes contiguous to just separate. Thorax almost entirely yellow, scutum entirely yellow or with pale fuscous clouds, sometimes with fuscous dots at setal bases, scutellum yellow but fuscous centrally, 4 setae, postscutellum brown centrally, yellow laterally, legs white to yellow, with dark bands as figured (Fig. 215), female claws all unequal, ratio of length of claws to fifth tarsal segment 28 : 15 : 32 in fore, 29 : 15 : 29 in mid, 20 : 9 : 26 in hind, male claws all small and equal. Wing (Fig. 214) with two-three spots, one before r-m cross-vein, sometimes one on R_1, and one at junction of costa and R_{4+5} extending into cell R_5, macrotrichia spread on apical half of wing on female, restricted to wing margin between the ends of the costa and M_2 in the male. Haltere white or with knob pale fuscous. Abdomen widely white, in male anterior three tergites each with two lateral and one median brown spots, next two tergites with a very large subsquare brown spot, tergite VI with a T-shaped dark spot, VII with a pair of lateral spots, VIII with a narrow caudal dark band, female with tergites II–VI and VIII with pale fuscous bands anteriorly, cerci white. Spermathecae two, round and subequal, each with a long, slightly curved diverticulum. Aedeagus (Fig. 216) bell-shaped, short caudal stem bent ventrally, parameres (Fig. 218) with detached basal arms, stems not swollen, apices sharply bent laterally, narrow, strongly tapered, slightly undulate.

Distribution: New Guinea, northern Queensland.

This species can be separated from *brandti* Tokunaga, which has a similar pattern of leg banding, by the longer processes on the spermathecae and the more slender stems and narrower, tapering, undulate apices of the parameres.

Acknowledgements

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References

Jones, R. H., 1961.—Descriptions of pupae of thirteen North American species of *Culicoides* (Diptera : Ceratopogonidae). *Ann. ent. Soc. Amer.*, 54 (5) : 729–746.

Lee, D. J., and Reye, E. J., 1955.—Australasian Ceratopogonidae (Diptera, Nematocera). Part VII. Notes on the genera *Alluaudomyia*, *Ceratopogon*, *Culicoides* and *Lasiohelea*. Proc. Linn. Soc. N.S.W., 79 (5–6) : 233–246.

Skuse, F. A. A., 1899.—Diptera of Australia. Part 6—The Chironomidae. Proc. Linn. Soc. N.S.W., 4 (2nd series) : 286–311.

Tokunaga, M., 1959.—New Guinea biting midges (Diptera : Ceratopogonidae). *Pacif. Insects*, 1 (2–3) : 177–313.

————, 1962.—Biting midges of the Ryukyu Islands (Diptera : Ceratopogonidae). *Pacif. Insects*, 4 (1) : 153–217.

————, 1963.—New Guinea biting midges (Diptera : Ceratopogonidae). *Pacif. Insects*, 5 (1) : 211–279.

Tokunaga, M., and Murachi, E. K., 1959.—Insects of Micronesia. Diptera : Ceratopogonidae. *Ins. Micronesia*, 12 (3) : 103–434.

Wirth, W. W., 1952.—The Heleidae of California. *Univ. Calif. Pubs. Ent.*, 9 : 95–266.

Wirth, W. W., and Delfinado, M. D., 1964.—Revision of the Oriental species of *Alluaudomyia* Kieffer (Diptera, Ceratopogonidae). *Pacif. Insects*, 6 (4) : 599–648.